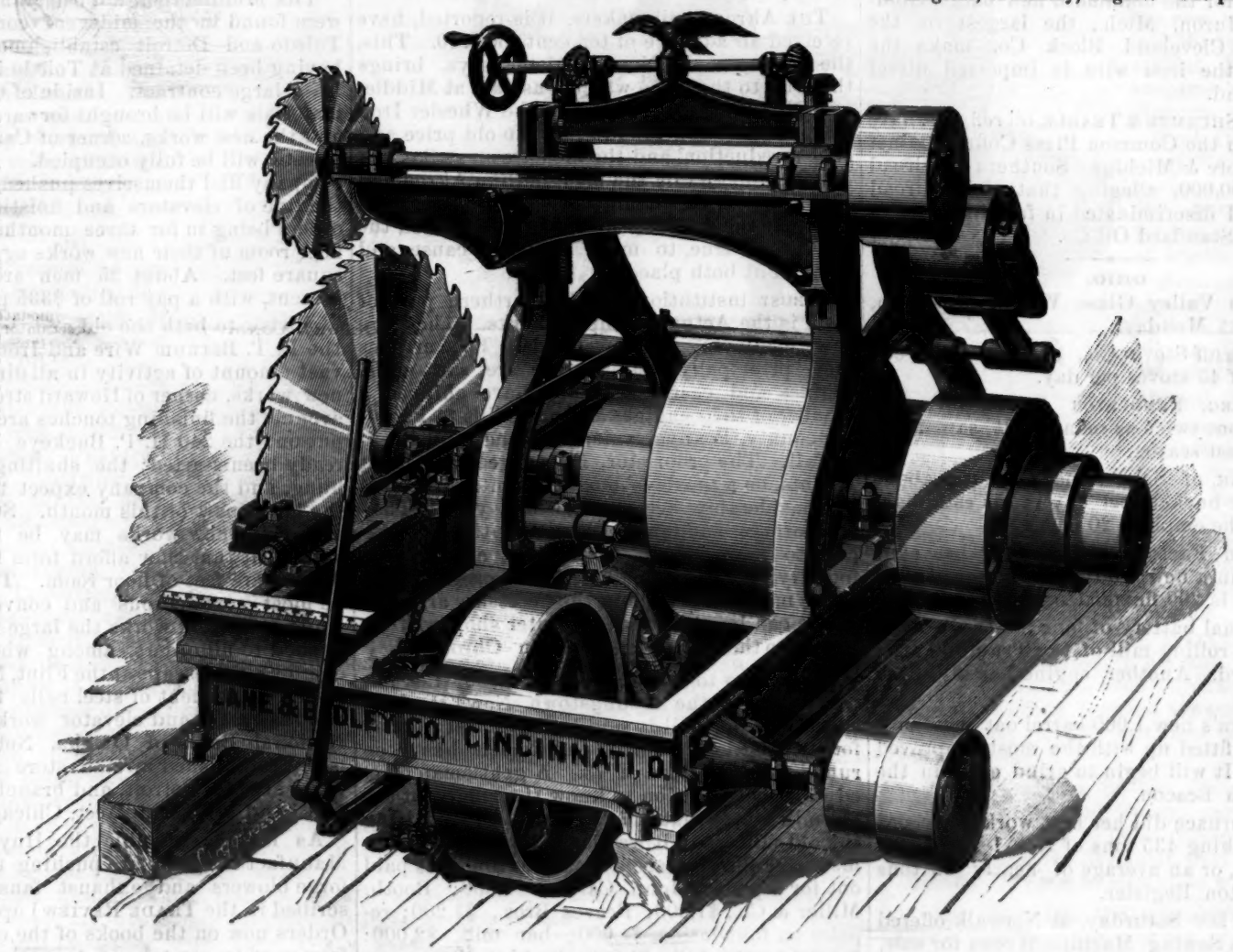
THE TRADE REVIEW
AND WESTERN MACHINIST.

WEEKLY EDITION, Vol. XVI—No. 32. } CLEVELAND, O., AUGUST 11, 1883. { MONTHLY EDITION Vol. I.—No. 8.

New Machinery.

The Standard Stationary Saw Mill.

The cut on this page represents the husk frame and the machinery belonging to it, of the "Standard Stationary" saw mill built by the Lane & Bodley Co., of Cincinnati, one of the two new patterns of saw mills introduced by them this spring. The engraving represents the double mill with the frame and feed works in position, saw guides, etc. The capacity of this mill will range from 20,000 to 35,000 feet per day. In the arrangement of its feed works this mill is quite different from the portable mills, so long made by this company, and well known in the saw mill trade of the West and South. A brief description will save the time of the reader in studying the cut. The frame is in one casting, of good roomy size, 8½x5½ feet, and 12 inches deep. The mandrel is 3½ inches diameter, main bearings 14 inches long, with sides babbitt filled for bearing of collars. The backing motion is of the "arbor gig" type, in which the motion is transmitted to the carriage from the mandrel, although it is possible to arrange an independent backing movement where it should be preferred. The mill is usually furnished with friction pulleys having a surface eight inches in width. The idler between the pinion shaft pulley and the mandrel pulley is hung to swing freely, and a bearing is always secured. The mandrel pulleys are webbed and heavy; the pinion shaft is 2 15-16 inches, and is covered in heavy ball and socket boxes, that the oscillation to place the "rag-wheel" in contact with either the feed or backing friction will not affect the journal. The feed cones are placed outside, giving ample room inside the frame for a wide-face belt pulley, also giving ready access to the same for a change of speed. The cones shown give a speed of 2½ inches, and 4 inches to the revolution of saw, and have a 5-inch belt. The carriage has also a fast return speed, which may be varied to suit purchasers. The top frame is substantial, the standards are of T section, with the bases well spread apart. The upper and front faces are planed to receive the yoke carrying the upper mandrel and to which it is bolted when in use. The ready and accurate vertical adjustment of the upper madrel is secured by two vertical screws, miter gear and hand-wheel. The tightener for the top saw belt has an iron frame and supporter on a shaft. A lever on the same shaft is placed convenient to the sawyer. These mills may have the steam feed and the rope feed supplied by the manufacturers when preferred. The board splitter is of heavy plate iron. The saw guide is easily adjustable when the saw is in motion and has no superior. The workmanship throughout is first-class. The mill is symetrical in its proportions, and will give satisfaction. The carriage, which will be illustrated in a later issue, runs on a T-rail track, truly planed, and large trucks with self-oiling boxes, has wrought iron base, fractional head-blocks and patent dogs, all of the most approved design for speed, accuracy and durability.



THE LANE & BODLEY CO. STATIONARY SAW-MILL.

Basic Steel at the Amsterdam Exhibition.

The specimens of basic steel contributed to the Amsterdam Exhibition by England, France, Germany, Austria, and Belgium, and collected by Messrs. Thomas and Gilchrist, constitute one of its many interesting features. The British specimens as described are designed to show the applicability of the steel to locomotive tubes, tin plates, Galloway tubes and rivets. France contributes striking illustrations of the ductility and the malleability of the metal. The specimens of plates from the Creusot Works have borne the severest punishment, including the flanging 6 inches by 6½ deep of a central hole, and the edges of a plate .59 inch thick, and 165 pounds in weight, and beaten out, the unflanged portion into a stride or A-shape, while the flanged edge is almost elliptical in outline and the hole circular. The capability of the angle iron appears in the sample bent hot into an S-shape, the upper possessing a smaller radius than the lower curve. The quality of the rails, made also by Messrs. Schneider, is told in the one complete twist on a length of 5 feet 9 inches, weighing 110 pounds. The handling of the basic plant by the Hoerde Hutten Verein, Germany, is shown mainly in a large collection of rail sections, tram rails and sleepers, together with some plates. Similar sections come from the Teplitzer Walzwerk, of Teplitz, Austria. The tenacity of the steel comes out in the manner in which the specimens have submitted to cold bending and twisting. Demonstrative of the different degrees of hardness which the metal can be made to acquire, is the circumstance that the carbon in the rails is .35 per cent., and that in the rolled sleepers .08 per cent. Test pieces made from the sleeper material have a limit of elasticity from 13.4 to 14.6 tons per square inch, a tensile strength of from 25.4 to 27.6 tons per square inch, an elongation of between 29 and 33 per cent., and a contraction of area of between 53 and 63 per cent. Tubes flanged and bent close, cold, yet without sign of fracture, are the contribution from a second Austrian steel works, the Witkowitzer Bergbau. The Belgian contribution is an assortment of wire, from the finest to the ordinary thick, from the Les Acieries d' Anglear, of Renory, Ougree. The proportion of carbon in this wire is from .12 to .15 per cent. The same firm likewise show steel wire upon their own account.

Prize for a Gas Engine.

At the recent meeting of the Gas Institute, Sheffield, Eng., Mr. Thomas Warrington read a paper relating to suggestions for increasing the consumption of gas, in which he said: "A good source of profit is the consumption for gas engines; but the use of these is at present limited by their excessive first cost. So long as a steam engine can be fixed for half, or less than a half, the first cost of a gas engine, the latter is too heavily handicapped; and I offer it as a crude suggestion, that the gas companies should jointly copy the system of the Society of Arts, and offer a prize well worth having for a gas engine, satisfactory in all points, which should cost no more to fit up than a steam engine. A prize of £10,000 would be exceedingly well expended on this, and be a trifle to each subcriber to the fund. It would certainly make a move in gas engines, and stir up the makers in an astonishing way; and a subscription of about £7 from each gas works would cover the total cost.

Elisha Gray, of Chicago, the electrician and a large owner of telephone rights, is about to build a large electrical college and experimental laboratory, at Highland Park, a pleasant suburb a few miles north of the city.

Hugh J. Jewett says the new Wyoming and Erie line will save his company 160 miles trackage on empty cars, going into the Lackawanna region.

Manufactures.

CLEVELAND.

THE Newburgh blast furnace started up Tuesday.

THE Siemens-Martin furnace of the Cleveland Rolling Mill Co. shut down Monday.

AN East Cleveland gentleman is figuring on the manufacture of matches by a new patent.

TENDERS have, it is understood, been made by Cleveland, Brown & Co., of this city, to rent the Russia mill at Niles of the assignees.

THE Union Rolling Mill Co., who have just started up, are reported behind in filling orders, but expect to catch up by the end of the month.

EIGHT hundred sets of wagon irons constitute the daily output of the Cleveland Hardware Co. They are rolled directly from muck bar. About 140 men are employed.

THE assignment is announced of the Union Foundry Co., Silas Merchant formerly President, N. F. Purcell, Secretary. Assets and liabilities not stated.

ABOUT one carload of wire fencing per day is present work of the Ohio Steel Barb Wire Fence Co., though when they are running double turn they put out 2½ car loads per day. Fifty men are employed.

UPSON, WALTON & Co. are furnishing the sails and rigging for the mammoth new barge, Golden Age, of Huron, Mich., the largest on the lakes. The Cleveland Block Co. make the blocks, and the iron wire is imported direct from England.

SCOFIELD, SHURMER & TEAGLE, oil refiners, have begun suit in the Common Pleas Court against the Lake Shore & Michigan Southern Railroad Co., for $100,000, alleging that the railroad company had discriminated in freight rates in favor of the Standard Oil Co.

OHIO.

THE Sippo Valley Glass Works Massillon, will start next Monday.

THE Woodruff Stove Co., of Salem, turn out an average of 45 stoves per day.

SPANGENBERG, PENDLETON & Co., Warren, have sold about twice as many belt saw mills as they did last season.

W. J. CLARK, of Salem, manufactures about 1,000 elevator-buckets per day in his establishment, where he employs 20 men.

THE Organ Factory at Norwalk has shut down to put in a new 150 horse-power engine. The capacity is 200 finished organs per month.

AN additional battery of four boilers is being placed in the rolling-mill of the Trumbull Iron Co., at Girard. Another engine has also been purchased.

SCHUMACHER'S new 1,000-barrel oat meal mill is now being fitted up with the most improved machinery. It will begin to grind early in the Fall.—[Akron Beacon.

BELMONT furnace did her best work on record last week, making 435 tons of No 1 mill iron in seven days, or an average of nearly 62 tons daily.—[Ironton Register.

THE sheriff last Saturday, at Norwalk offered the Dauntless Sewing Machine Works for sale, but received no bids. Two-thirds of the ap praisal would be nearly $22,000.

THE Novelty Iron Works are doing quite a business in the manufacture of cigar machines. They are at present engaged upon fifty for a Pittsburgh firm.—[Canton Repository.

MONROE and J. F. Seiberling are building a mammoth elevator, with a capacity of 100,000 barrels in their new flouring mill in the Sixth Ward.—[Akron Sunday Gazette.

THE old machine shop in Canal Fulton has been purchased by the Canton Tool Co. and put in repair and is now getting under good headway. This shop has been idle for ten or twelve years.

THE Cherry Valley Iron Co., of Leetonia, employ 700 men at their furnaces, rolling-mills, ore and coal mines, and coke-ovens. They have 140 ovens and produce an average of 120 tons of coke per day.

WEBSTER, CAMP & LANE MACHINE Co. are so crowded with work that their buildings are being taxed to their utmost capacity. Some new machinery has been placed in position within the past few days.—[Akron Beacon.

THE Springfield Republic is thoroughly convinced that the Champion Mower and Reaper Works, of that city, have the *ne plus ultra* of cord binders, as demonstrated by recent field tests.

AT the Jefferson Iron Works, Steubenville, a new nail factory is being built adjoining the old one, and will be thrown into the old one when completed. There will be 70 machines in the new factory, which, with 75 in the old, makes the number 145, an increase of 30.

THE U. S. Iron and Tinplate Co., Limited, have just completed at Demmler Station a large warehouse, and now have one of the most complete works of the kind in the country. The machinery was all made for the special purpose for which it is used, the manufacture of fine sheet iron and sheet steel.

To run the machinery at the Louisville Exposition, nine engines of the most approved pattern are necessary. They are: One Reynolds-Corliss engine, 600 horse-power; one Porter-Allen, 275 horse-power; one Cummer, 100 horse-power; one Harris Corliss, 200 horse-power; one Taylor, 100 horse-power; one Westinghouse, 100 horse power; three Armington & Sims, 400 horse-power; and one Buckeye, 100 horse-power.

THE Akron chainmakers, it is reported, have received an advance of ten cents per 100. This, the Youngstown News-Register says, brings them up to the price which was paid at Middlesex, Mercer county, Pa., but the Wheeler Iron Co. refuse to continue to pay the old price and offer a reduction, and the men are on strike. It is now proposed by the men, both in Akron and Middlesex, if the denial of the Wheeler Iron Co., that the Akron men have not received the advance, is true, to make common cause and demand at both places.

A BUSY institution in the northern part of town is the Aetna Machine Works. They are now employing twenty hands. The articles they principally manufacture are saw mills, engines and castings. They have shipped a number of their engines and saw mills to Paulding county, Pennyslvania, Alabama, and Beaver Fall. The proprietor, F. I. Freeman, is at Atlanta, on a ten days' business visit. Business is considerably better than last year. They have orders enough for three months, and expect to have steady work right along. The foundry has been completed, and castings are being made. As soon as the necessary arrangements can be made the carpenter shop will be moved to the foundry.—[Warren Chronicle.

REFERRING to the Ward failure, the Niles correspondent of the Youngstown News-Register says: The old mill is said to have lost money for its proprietors during the time it has been run since the failure of '73. A gentleman placed in a good position to know the affairs of the old mill states that the expense for repairing the old mill when it was last started was enormous. Following are some of the amounts paid out for repairs: John Carter, $2,500; Booth, Miller & Co., $1,000; Reeves Bros., $1,200; repairs on foundation, $1,000; bar mill, $2,000; for carpenter bill, $1,000, besides the wages paid for labor and the cost of iron and nails, which would run up the cost of repairs on the old mill to about $11,000. It is claimed that the operation of the old mill will pay as well as any mill of its capacity if run right.

THE repairs to the Hannah furnace are nearly completed, and it will probably be ready to put in blast within a week.—Summers Bros & Co., operating the rolling mill at Struthers, are on double turn and have but little difficulty in selling all the sheet iron they can manufacture. —The U. S. Manufacturing Co. is engaged in producing iron under the process invented by Mr. J. J. Johnson, of which mention was recently made. The pig iron is placed in a puddling furnace and after being heated forged into bars, thus obviating the necessity of using a heating furnace. All the tests made thus far prove it to be eminently satisfactory.—The Youngstown Car Manufacturing Co. is employing a full complement of men on full time. They are filling a large order for cars for the Pittsburgh, Cleveland & Toledo Railroad, and are completing orders for other lines. They are engaged in manufacturing the Goodrich dump car, which was so highly complimented at the recent exposition in Chicago.—Younsgtown News-Register.

DETROIT.

BY A STAFF CORRESPONDENT OF THE TRADE REVIEW.

THE Detroit Wire Works have been running a little over a year and report business good, with a fair prospect for the Fall.

ALTHOUGH the season has been rather dull with the Detroit Copper and Brass Rolling Mills, they find it picking up as Fall approaches, especially in the line of copper. Their trade extends all over the country but is best in Chicago, St. Louis and down the Mississippi River. They empley 100 men.

A NEW 100 H. P. engine is being placed in the Detroit File Works, in consequence of which the works are closed down, but they will resume operations on the 15th. This change is necessitated by reason of the demand for more power. They report trade good, with more orders on their books than for years. Their sales extend throughout Ohio, Indiana, Wisconsin, Minnesota, Iowa and Illinois. Most of their raw material comes from Syracuse, N. Y. They have a capacity of 1,000 dozen files per week and employ 50 men.

THE Middlebrook & Post Manufacturing Co. were found in the midst of consolidating the Toledo and Detroit establishments, Mr. Post having been detained at Toledo in order to finish a large contract. Inside of ten days all the materials will be brought forward from Toledo and the new works, corner of Cass and Larned streets, will be fully occupied. At present the company find themselves pushed with work in the line of elevators and hoisting machinery, orders being in for three months ahead. The floor room of their new works aggregates 12,000 square feet. About 25 men are employed at present, with a pay roll of $335 per week.

A visit to both the old and the new works of the E. T. Barnum Wire and Iron Co. revealed a vast amount of activity in all directions. At the new works, corner of Howard street and Wabash avenue, the finishing touches are being rapidly put on; the 240 H. P. Buckeye engine has already been started; the shafting has all been hung, and the company expect to move in by the latter part of this month. Some idea of the size of the new works may be formed by the statement that they afford form 130,000 to 140,000 square feet of floor room. The offices will be most commodious and convenient. Meanwhile at the old works the large force is being pushed to fill orders, among which have been one for a fire escape at the Flint, Mich., Asylum; a full complement of steel cells for the jail at Sandusky, O., and elevator work for the First National Bank of Omaha, Neb. They have lately established a retail store at 105 Woodward avenue, Detroit, and branches at Windsor, Ont., and 110 Lake street, Chicago.

As fast as possible the Huyette & Smith Manufacturing Co. are pushing their excellent forge blowers and exhaust fans (already described in the TRADE REVIEW) upon the market. Orders now on the books of the company come from a wide stretch of territory, viz.: From Cambridge, O., Antwerp, O., Saulsbury, Md., Battle Creek, Mich., Portsmouth, O., Morrisburg, Ont., Midland, Mich., Williamsburg, Ky., Columbus, O. (two), Leavenworth, Kas., and Wapakoneta, O. They lately filled two telegraphic orders from Portland, Ore., and have just placed one of their ventilating fans in the Cleveland mill of the Cleveland Paper Co. The success of their fan has also been demonstrated in a new direction, namely, in elevating cotton into the loft by suction, previous to its passing into the gin. For this this they have lately filled an order from Kyle, Tex. An inspection of the construction and workings of the machine, both in the shops and in actual operation at the planing mill of M. C. Huyette & Co., readily confirmed the statement of Mr. Huyette that he had one at work in Michigan blowing shavings half a mile.

IN GENERAL.

AT the Sharon, (Pa.) Iron Works the sheet

and puddle mills are running double turn; the nail factory is idle.

KEEL Ridge furnace, near Sharon, Pa., was blown in last week after being out six weeks.

A new furnace will be necessitated by a recent explosion uf an air receiver in the works of Reis Bros., New Castle, Pa.

OUT of six furnaces of the Bethlehem (Pa.) Iron Co. which were shut down when the lockout there began, one is idle, and the fires of two have been extinguished. The other three are turning out pig iron every day.

THE Calumet Iron and Steel Co., Chicago, has given a mortgage to George A. Ives, as trustee, for $300,000 on ten years' time, with interest at 6 per cent. per annum in gold, payable semi-annually at the Metropolitan Bank of New York. To secure this the company will issue 300 $1,000 bonds. This is to take up a first mortgage of $150,000 and pay in full other obligations.

AT the annual meeting of the North Chicago Rolling Mill Co. in Chicago, last week, there were 44,120 shares represented; out of a total of 50,000 shares. It was reported that the volume of business done during the fiscal year ending June 30, 1883, was nearly that of the previous year, being in the aggregate 545,000 tons of iron and steel. The gross earnings were much less than they were during the previous year, while the outlook for the coming year was very uncertain and unsatisfactory.

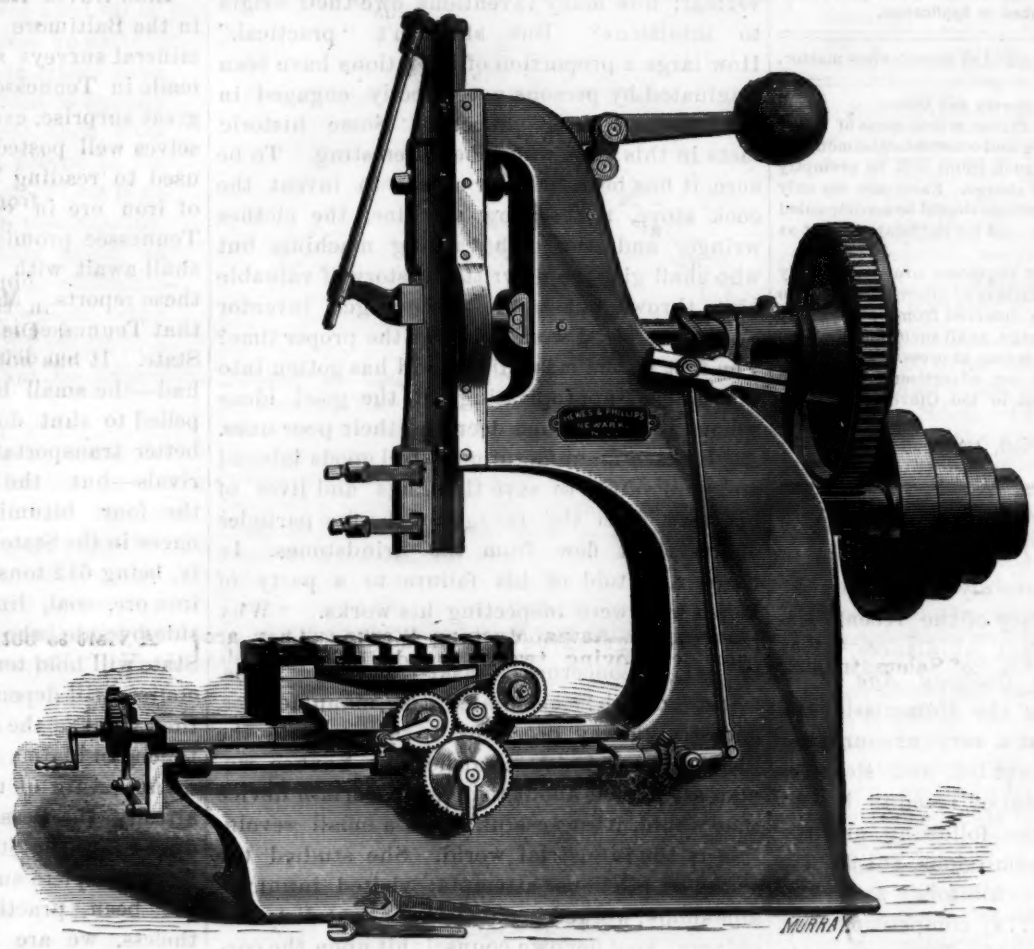
We are in receipt of the following: "We notice the statement in your issue of August 4, relative to the organization of our company. The notice is correct with our important exception, to-wit: Geo. E. Brettell has no interest whatever, pecuniary, or otherwise, in the business of this firm, since June 15, 1883. Respectfully yours, Rochester Machine Tool Works, Geo. W. Davison, Treasurer." In reference to the same matter, Mr. Brettell himself writes: "I have sold out to that company, or men who now compose it, all my old tools, patterns, &c., for the purpose of putting in entire new machinery and better adapted to the business I am engaged in. I have now got a more commodious and better shop, where I have put in heavier machinery and can do a more extensive business. I have now got in all my new machinery; most of my new and improved patterns are made, and I am in better shape than ever to turn out first-class iron planers. I will endeavor to keep my customers supplied with planers that will be better even than those I manufactured with my old tools. I have no connection whatever with the company styled the Rochester Machine Tool Co."

Compressed Steel.

Tests have been made at the Watertown arsenal on cold-worked steel made by Naylor & Co. at the Norway steel and iron works, Boston, Mass. The elastic limit is raised from 26,540 pounds per square inch (1,966 kgs. per sq. cm.), in the hot-rolled bar, to 61,000 pounds (4,288 kgs.) in the cold-rolled steel. The ultimate strength is increased from 55,400 pounds (3,895 kgs.) to 70,420 (5,140 kgs.), in one case, and to 81,890 (5,757 kgs.) in another. The results of tests made at the mechanical laboratory of the department of engineering of the Stevens Institute of Technology are given, showing the increase due to cold rolling to be 70 per cent. of the original torsional strength with iron, and over 150 per cent. with soft steel. The resilience, or shock-resisting power, was increased, in an average of three tests, nearly 300 per cent. in iron, and to double the latter quantity in steel.

A New Slotting Machine.

The new slotting machine herewith illustrated admits of the movement of the ram from zero to full stroke, the relative positon of the ram in the guides being changed by means of an angular rod and lever adjustment. The ram has eight speeds, with counterbalance and quick return motion, the feed being operated at the upper end of the stroke. The machine is positive in all directions and is changed from fine to coarse by variable crank motion. The distance from the tool seat on the front of the ram to the outside of the frame is 27 inches; the height from the table to the frame, 20 inches. The compound table has a longitudinal feed of 24 inches and a transverse feed of 28 inches. The machine here shown, which has a 12-inch stroke, will slot a wheel 56 inches in diameter. The upper table is 32 inches in diameter and is revolved automatically by worm motion.



HEWES & PHILLIPS' NEW SLOTTING MACHINE.

When the circular feed is not in use, the table may be fastened permanently in any position by means of clamps at the corners. In its construction this slotter is of the best material. All screws and spindles are made of steel, and the moving surfaces are broad and scraped to a perfect bearing. The lost motion in the sliding surfaces is taken up by taper wedges with screw adjustments. This machine is manufactured by Hewes & Phillips, Newark, N. J., who make slotting machines from 6-inch stroke up to 54-inch stroke.

THE Locomotive says that the summary of the work of the inspectors of the Hartford Steam Boiler Inspection and Insurance Company for the month of May last shows a most satisfactory state of affairs, in a business sense, but a pretty unsatisfactory state from an engineering or mechanical standpoint. The whole number of inspection trips made foots up 2463, during which 5188 boilers were visited. Of this number 2333 were thoroughly examined, both externally and internally, and 313 others were subjected to the hydrostatic tese. The number of boilers condemned was twenty-three. The total number of defects found which were considered of a sufficiently serious nature to be reported was 3532, of which 507, or fourteen per cent., were dangerous.

A CURIOUS fact has been observed by Profs. Ayrton and Perry. Soft iron when heated between a red and white heat ceases to be attracted by a magnet. When soft iron is bent between red and white hot iron it ceases to be attracted by a magnet.

Contracts and Construction.

[Under this head the TRADE REVIEW proposes to summarize various large contracts to be let within easy range of Cleveland, to the end that its advertisers, both at home and abroad, may be informed and be thus enabled to put in bids for different parts of the work in which they may be interested. If purchasing agents of railroads and of other large corporations will forward their invitations for proposals, the REVIEW will put them in shape and publish the same gratuitously. Mention the TRADE REVIEW in writing to parties for further information.]

SPRINGFIELD, O., is to have a match factory.

A bridge over the Schuylkill near Limerick Station (Pa). is projected.

THE Akron Toy Company, capital stock $10,000, has filed a certificate of incorporation.

GENEVA, O., is booked for a new brick flouring mill, with a daily capacity of 175 barrels.

A steam-heater company, it is said, will begin to manufacture heaters shortly at Canton, O.

BUCYRUS, O., has just voted waterworks.

SURVEYORS will soon be at work on the proposed line between Belleville and Centralia (Ill).

PROJECTED new water works: At Houghton, Mich., Ravenna, O., Warren, O., Nevada, Kas., and Wellington, Kas.

THE corner-stone of the new opera house was laid Wednesday, June 25, atFlint, Mich., under the auspices of the Free Masons.

THE Ohio Valley Cement Co. has secured a contract to furnish 150,000 barrels of cement for the new State House at Austin, Tex.

ELEGANT new residences are to be erected this Fall in Youngstown, O., by Judge Arrel and Messrs. Henry Wick and John C. Wick.

GENERAL Superintendent McCool, of the Detroit, Mackinac & Marquette Railroad, asks for bids up to August 17, at Marquette, for building the extension of that road from Marquette to Ishpeming.

MALLEABLE iron works are to be started in Keokuk, Ia., at an early day. Ground has been purchased, and preparations are going forward toward the erection of a foundry, 25x30 feet, and a finishing shop, 22x40 feet.

THE President of the Cincinnati Builders' Exchange, Elwood Cuezy, says he has never known builders to be so pressed with work as now. Same in Cleveland, only it didn't need a disastrous flood to stimulate work.

MR. MANNING, the engineer of the Central Ohio, has begun a survey to locate the line from Bellaire to Bridgeport. The Central Ohio and the Tuscarawas Valley roads are to be united and further extensions made.

RECENT fires affording opportunity for sales of machinery: At Cleveland, Cleveland Chair Co.'s works, loss $12,000, insured; at Detroit, Henkel & Voorhees, flour mill, loss over insurance, $25,500; at Oscoda, Mich., Oscoda Salt & Lumber Co.'s works, loss $75,000, insurance $45,000; at Grand Rapids, Mich., Union Furniture Co.'s works; at Bellville, Ill., Morgan's foundry, loss $10,000, insurance $4,000.

THE coming new industrial empire is to be in Russia. At present the number of iron-producing establishments in Russia is 141, with 205 blast furnaces, producing yearly 450,000 tons of pig iron. There are also 210 rolling-mills manufacturing rails, bar iron, etc. Of foundries there are 119, with 7,000 workmen; of engine-works, 187, with 42,000 workmen; and 45 manufactories of wire nails and wire rods, with 4,400 workmen.

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To Machinists, Manufacturers and Others.

The publishers of the Trade Review solicit items of information concerning manufacturing and other establishments in any part of the country, and all such items will be promptly inserted in these columns, free of charge. Facts are the only things needed; and all communications should be accompanied with the name of the contributor—not for publication—but as a guarantee of good faith.

Manufacturers, machinists and engineers are particularly requested to communicate any matters of interest relating to their specialties. No one need be deterred from sending any interesting facts in his own language, as all such contributions will be properly revised before sending to press.

☞ When writing to any of our advertisers, please say that you saw their advertisement in the Cleveland Trade Review.

Northwestern Agent.—H. M. Brownell, 410 Nicollet Ave., [Minneapolis, Min.

WHAT IT COSTS TO RUN AN EXPOSITION.

With a frankness certainly commendable, Mr. E. H. Talbott, Secretary of the recent National Exposition of Railway Appliances, gives to the public through his *Railway Age* (Chicago) the balance sheet of the Commissioners. The result is certainly not a very encouraging offset for months of constant toil and sleepless vigilance. The grand total of receipts is put at $111,865.47, of which the following are the leading items: General admissions, $61,919.10; space fees, $25,921.97; exhibitors' and employes' season tickets, $6,779; competition fees, $6,490; entrance fees, $5,115. The aggregate of expenditures was $135,326.01, into which the following, among other items entered: Annex and its maintenance, $38,039.52; additions and improvements to main building, $17,751.10; electric railway, $13,659.98; advertising, $8,570.67; printing and stationery, $6,107.08; payrolls of superintendents, secretary, police, etc., $17,055.99. Various unpaid bills, and certain credits by way of lumber to be sold, railway tickets to be redeemed, etc., foot up about $14,000 on both sides of the sheet, so that the deficiency will not vary much from $23,500. It will be seen from the above that the fatal item of expense was the annex and the outlays connected with it. This alone exceeded the amount received for space, by over $12,000, yet the managers were in a measure compelled to build it or throw out some of the most interesting and valuable exhibits. Certainly, if they erred it was on the side of redeeming their promises to the public. The receipts for general admission would seem to indicate an aggregate attendance of visitors (making allowance for "25-cent days") of not to exceed 150,000—if we are wrong, we would be pleased to be corrected. Quite in contrast was the total attendance of visitors at the Cincinnati Exposition last year, namely, 351,000. How far the regular admission of 50 cents unfavorably influenced the attendance at Chicago cannot, of course, be stated; but we believe it had an important bearing upon the result. Of course it is vastly easier to tell how to run an exposition than it is to run one, and we are quite willing to believe that the more settled judgment of the public will award to the managers the credit of having done their work as well as ordinary human foresight could have enabled anyone to. Certainly a deficit of between $23,000 and $24,000 doesn't bear out the idea of an organized effort to fleece the public.

WOMEN AS INVENTORS.

Why not? Does a woman lack originality? Has she not the power of reasoning from cause to effect? Is she so constituted that she can't "tinker"? Woman's quick intuitions are proverbial; how many inventions owe their origin to intuitions? But she isn't "practical." How large a proportion of inventions have been originated by persons not directly engaged in the trades thereby affected? Some historic facts in this line would be interesting. To be sure, it has been left for a man to invent the cook stove, the sewing machine, the clothes wringer and the dish washing machine, but who shall give the unwritten history of valuable hints thrown out to the discouraged inventor by an interested woman just at the proper time? The fact is, the masculine world has gotten into the habit of appropriating all the good ideas women have and then decrying their poor ones. An Eastern manufacturer of steel goods labored long and vainly to save the lungs and lives of his men from the ravages of the fine particles of steel that flew from the grindstones. In despair, he told of his failure to a party of ladies who were inspecting his works. "Why not fit a magnet around their mouths?" modestly and unconcernedly asked a young miss. "Sure enough!" ejaculated the manufacturer, and straightway proceeded to appropriate the idea as his own. A clear-headed Yankee woman set herself about to invent a certain device that would, if successful, work a small revolution in the industrial world. She studied the errors of previous attempts; visited innumerable shops; worked in old clothes about dirty machinery; kept her own counsel; hit upon the correct principle; took in a partner to furnish her capital in making practical application of it, and heard one day that he was advertising it under his own name! That terminated the contract, of course. Just why it is that practical men have an aversion to accepting the results of woman's thought and application it is difficult to see. At all events, being founded on prejudice, it is bound sooner or later to pass away. That women can invent has been demonstrated. That she has the nerve to overcome obstacles need scarcely be said. That she is growing into conditions more conducive to an active exercise of her inventive talent, we firmly believe. *Place aux dames!*

ENOUGH SAID.

Oho! so our Free Trade friends of the *American Artisan* do not wish to be understood from their somewhat misty arguments that American tinplates, if allowed by a reasonable duty to to prosper here, would not be as good as foreign-made goods. Let us put a pin right there. What the *Artisan* does claim, with a vehemence worthy a better cause, is that "the cry raised by protectionists that there would be no more worthless tinplates imported, and none manufactured in this country, if only a high tariff duty were imposed, is simple and and utter nonsense." Now if the *Artisan* will allow us, we will frankly say that we have heard no such cry, would not join in it if it were raised, but would consider it an absurd proceeding to do so. This straw man being out of the way, it only remains to say that the *Artisan*, by admitting our ability to make as good tinplate as our Free Trade English competitors, concedes the whole question; and since the lack of protection is the only thing that hinders our making tinplates and thus breaking loose from paying tribute to the extent of millions annually to Great Britain, what reasonable man can object to such legislation as will enable us to do this? But we forget—our Free Trade friends are not always reasonable.

TENNESSEE IRON.

Ellis David Rees, of Chattanooga, predicts in the Baltimore *Manufacturers' Record* that mineral surveys and examinations now being made in Tennessee will, when published, be a great surprise, even to those supposing themselves well posted. The country has become used to reading of "inexhaustible supplies" of iron ore in various favored sections, but Tennessee promises to eclipse them all. We shall await with interest the publication of these reports. Meanwhile it is but just to say that Tennessee is getting to be a great iron State. It has not as many furnaces as it once had—the small bloomeries having been compelled to shut down in competition with the better transportation facilities of their larger rivals—but the aggregate production of the four bituminous and five charcoal furnaces in the State is much greater than formerly, being 612 tons of pig iron per day. With iron ore, coal, limestone and sandstone lying side by side, who can predict what rank the State will hold ten years hence? As much, of course, will depend upon the quality as upon the extent of the ore. Our enthusiastic Chattanoogan claims for it qualities equal to the manufacture of the best Bessemer steel, and already the Bessemer process has been introduced into the State; but we may safely doubt if the complete success of the experiment has yet been practically demonstrated. Nevertheless, we are glad to note the fact that Tennessee is making such gigantic strides in the line of solid prosperity, and that this prosperity has for its basis the systematic and intelligent development of the vast mineral resources of that State.

CLEVELAND AS A HARDWARE MARKET

There is every reason to pin firm faith to the belief that Cleveland is destined to become one of the few leading hardware markets of the country. Already she can count within her borders five extensive establishments for the manufacture of various forms of hardware, and the yearly transactions of her seven wholesale houses run up into the millions. The volume of trade the present year has thus far been about the same as in 1882, and wholesalers have had no reason to complain. Whether there will be any especial activity this Fall is uncertain. By reference to our market columns it will be seen that the prediction is made that a conservative policy is likely to prevail among jobbers and small dealers, on account of the partial failure of the wheat crop. However that may be, the fact remains that the growth of the business in Cleveland shows a steady increase from year to year, and there is no reason why she should not become, as she already is in a measure, the commanding market for a large portion of the West and Northwest. Towards the accomplish-

ment of this end the Trade Review hopes to prove itself a valuable factor.

As was to be expected, Mr. Edward J. Shriver, Secretary of the New York Metal Exchange, springs to its defence against the criticisms made upon it by some of our contemporaries. In a card to the *Stove and Hardware Reporter*, of St. Louis, he corrects the statement that no delivery of metals is contemplated in the transactions of the Exchange and declares that "delivery *must* be made." Having also been misled in this respect, we are quite willing to give the Exchange the benefit of the correction. Nevertheless, Mr. Shriver makes a damaging admission when he says that, while it is "perfectly true" that "the advent of speculators does not consume any more iron, * * * it does create an entirely new demand for metals, and that whether the goods purchased are used up or put into store, and kept there, makes no earthly difference to the smelter, who, in either case, has an outlet for his product that is equally good for him." The only benefit, then, from speculation of this kind must accrue to the speculators and to the smelters. There is no claim that it will be of service to manufacturers; nor can it be. The only effect, as pointed out by the *Reporter*, is to stimulate production by the smelters, which being purely fictitious must inevitably result in a reaction, and to this there are no redeeming features.

The fuel problem has taken so many forms, and the experiments in this direction have been so often utterly futile, that the man or woman who can provide the cheapest device for burning the cheapest fuel, and with the best results, may consider his or her fortune made. We say "woman" advisedly, for to that sex is to be credited the simplest and most effective device thus far brought out for using crude petroleum for steam-raising and furnace-heating purposes. The inventor herself speaks modestly of her achievement, in another column, and it is not giving too much prominence to a single invention—in view of its possibilities—to express the hope that such opportunity will be given her in Cleveland to perfect its application to heating furnaces as will enable her to demonstrate its practibility in connection with the manufacture of iron, as it has already been amply shown in the direction of raising steam under boilers.

Cleveland still grows. A comparatively young man can look back to the time when she was less than 45,000 in population; now her annual increase is enough to start a good-sized city of the second class. The new City Directory emphasizes this fact not only in its aldermanic proportions but also in the number of names it contains, as compared with previous years. This year, using the customary multiple, the 65,198 names indicate a population not far short of 220,000. At the present rate of increase the quarter-of-a-million point will have been reached before a great many people wake up to the fact.

Indiana will probably have a Mechanics' Exposition next year. How would an Exposition of Motors do for Cleveland?

A mechanic of Paterson, N. J., is building a small propeller, 16 feet long, the boiler of which is an ordinary ale cask. It is fitted with flues and is said to be capable of standing 200 pounds pressure. It has been satisfactorily tested at 40 pounds. The inventor is a practical mechanic in the employ of the Paterson Locomotive Works.

Practical Mechanics.

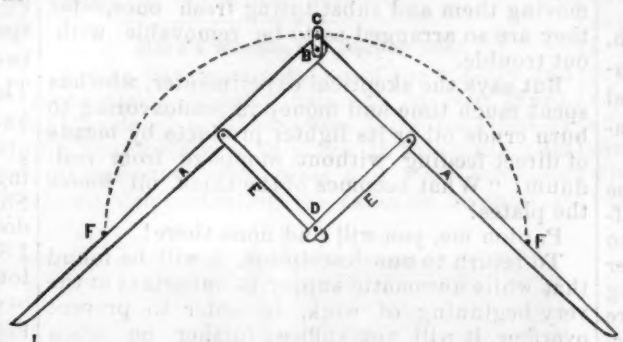
Written for the Trade Review and Western Machinist.

Hints for Beginners, from an Old Mechanic.

BY WM. WARD, CLEVELAND.

Explanatory—In the series of short papers, herewith begun, I propose simply to write for young mechanics, not for critics or the learned. My object is, not to tell anything especially new or startling, but to assist those who have not had the benefit of experience. What I shall present will be merely the result of my own experimenting, and I shall deal only with what has been practically demonstrated in my own experience. This explanation, I trust, will at once put me on good terms with those I desire to help and will, at the same time, disarm merely captious criticism.

I.—*To draw any part of a circle without the aid of a center.* Take two straight light strips of wood, the length to suit the work to be done (the one I have used for about 20 years I can extend to twelve feet); joint them together something like a carpenter's rule; put on braces so that you can stay it at any angle from the straight line to the form of a square; place a piece of plate metal of any kind strong enough to hold a tube for a pencil exactly at the angle desired; set two pins or wire nails one at each end of the distance you wish to draw; mark the centre; determine the distance you wish to rise; move the instrument with pencil from one end to the other, and you will have a true curve line to suit the rise. To draw a circle without using the center, set your instrument to a square; it will draw a half-circle. Reverse, and you will have a full circle drawn without using the center.



The accompanying cut shows the form of the instrument above described; C shows the pencil; B, the plate metal; D, the thumb-screw; E, E, the braces; A, A, the arms; F, F, the stationary pins or nails. The dotted line shows the direction which the pencil will take when it is started at either side and the instrument moved to the right or left, within the space enclosed by the pins or nails (the angle of the arms in this instance nearly 45 degrees).

In my next I will try to describe a device for drawing a perfect circle, oval or straight line by one and the same process.

Some Peculiar Properties of Steel.

Although the characteristic property of steel upon which its usefulness mainly depends consists in its capacity for hardening, the question, Why does steel harden? has never yet been satisfactorily answered. Until it is fully answered, all the different methods of hardening must necessarily partake more or less of the nature of experiments. It is generally accepted that by heating and cooling steel in different degrees and at different rates of rapidity we may not only obtain a great difference between extremes of hardness and softness, but also almost any intermediate degree of hardness and softness between these extremes. Recent investigations have demonstrated the fact that, aside from its chemical composition, the temperability of steel is also largely influenced by the degree of heat at which it is tempered, and also by the temperature, the conductivity and the capacity for heat, and the boiling point of the cooling liquid. Various degrees of hardness are required for various purposes. The following simple experiment will serve to ascertain the proper heat at which steel should be cooled—say in water—so as to obtain the requisite hardness for a given purpose. Take from the lot under consideration a bar of ordinary size—say 1x½ inch—and heat the end of it, for from 8 to 10 inches, to a dull red, and then nick the heated part all around at intervals of about ¾ inch. Next return the bar to the fire, heating only the end of it to a white or scintillating heat, and allowing the nicked spaces to become heated by conduction, dimishing gradually from the white heat at the end in the fire to a black heat in the nicked pace furthest from it. Then quench the bar in cold water, and keep it there till quite cold. If the heating has been properly performed, the successive nicked spaces have been cooled at the following heats:

1. White.
2. Yellow.
3. Orange.
4. Bright red.
5. Cherry.
6. Dark cherry.
7. Black.

Next wipe the cooled parts perfectly dry, especially in the notches, and break of the pieces over the corner of an anvil, taking care to catch the pieces in a dry box, so as to keep the fractures, and it will be seen, numbering the pieces from the fire end to the cold end, that the appearance of fractures and hardness are as follows:

No.	Fracture.	Hardness.
1	Coarse, yellowish cast; very lustrous.	Will scratch glass.
2	Finer than No. 1, coarser than No. 7; fiery lustre.	Excessively hard.
3	As above with finer grain.	Hardly take the file.
4	About same grain as No. 7, but still fiery lustre.	Sharp file will make impression.
5	Much finer grain than No. 8; no fiery lustre; very strong; hard through.	Not so hard as No. 4.
6	Refined and hard on corners and edges, and rather coarse and not so hard in the centre; silky on the edges.	About right for tap teeth, milling tools, Rose bits, etc.
7	Original grain of bar.	Strength and hardness corresponding to appearance.

It may be expected that the heated end will show a water crack extending up to No. 5, but never into No. 6. In order to restore any of the first pieces to the grain of No. 7 it is only necessary to replace it in the fire, heat to a good, but not bright, red, and leave it there from 15 to 30 minutes, and then cool slowly. This restoring is not peculiar to any kind of steel, but holds good for all—yet a restored piece of steel is never as good as it was before. If the user of steel will carefully study the results of this experiment, he will have no difficulty in knowing where to look for defective work. If steel, heated uniformly and moderately, cracks in the bath, it will be but right to condemn it as unreliable, but care must be taken to intrust the test only to a person who really knows how to make it, and who has satisfied himself by previous experiments that every visible variation of temperature is assuredly followed in the hardened piece by an equally visible difference in color and grain.

As to the influence of the cooling liquid upon the tempering of the steel, there is yet a large field of inquiry to be traversed. In the first place, then, it is an established fact that the temperature of the cooling liquid in itself furnishes no criterion of the hardness to be obtained. Steel may be hardened not only in cold water, but also in boiling water, boiling oil, melted lead, tin or zinc. Considering the established fact that steel loses considerable of its hardness—"that the temper is drawn"—by heating it to about 600 degrees F., it seems paradoxical to assert that cooling it in a metal bath of 750 deg. to 800 deg. F. should harden it. Yet we know that steel wire will harden in passing through a zinc bath, and loses its temper again by being allowed to remain for a longer time in the same bath. Knowing that hardening and tempering are accompanied by a change of the internal structure of steel, and that no such change can take place at a lower temperature than 900 deg. F., we must conclude that the hardening of steel depends chiefly on the rapidity with which it is cooled from a temperature of about 950 deg deg. F. to one below 950 deg. F.—or, in other words, the rapidity with which its redness is destroyed. On the other hand, the softening of steel, or drawing of the temper, is due to exposure to temperature differences between other limits. This recognized, the tempering of steel can no longer be admitted to be dependent on the temperature or conductivity of the cooling liquid alone. In fact, we know that fused metals possess remarkable power of hardening. With this in view, then, let us start with steel hardening be-

[Continued on Page 12.]

CRUDE OIL AS A FUEL.

A NEW WAY FOR HEATING BOILERS AND IRON FURNACES.

A Lady the Inventor—The Difficulties Stated and the Process Described.

BY MISS AMANDA T. JONES.

Written for the TRADE REVIEW AND WESTERN MACHINIST.

In view of the innumerable efforts made during the past twenty years to heat furnaces satisfactorily with crude petroleum, it requires a good deal of courage to assert that so desirable a result is not after all, very difficult of accomplishment: And to assert this in face of the indifference and incredulity of capitalists, whose patience and whose purses have been severely taxed by mistaken experimenters, an inventor must needs be able to render abundant reason for the faith that is in him.

The writer, having both courage and faith, and also feeling able "to render a reason" ventures to claim that she has perceived and tested conclusively to a considerable extent, the conditions requisite to success.

Any method of burning crude oil to be worthy of acceptance, must be safe, simple, effectual and economical. It must require no assistance of other fuel, from first to last, either in heating a furnace to begin with, or in running a supplementary furnace for the manufacture of gas. There must be no supplementary furnace. There must be no need of special precaution on the part of the operator, to insure freedom from danger. Oil must be fed directly to the very furnace where work is to be done. It must heat that furnace thoroughly without the aid of an ounce of coal or a sliver of wood. It must be evenly distributed across the entire breadth of the furnace and, by some instantaneous process, atomized before ignition can take place. I do not say it must be converted into gas, since the whole is not convertible. I say it must be atomized, because only in that way can its minute hydro-carbons ignite and consume, being yet charged with gas that has not had opportunity to escape, and without which they will not burn. Nor must combustion be wholly dependent upon such air-supply as may be obtained from blast. There must be natural draught, aided only by as much blast as may be needed to complete combustion, already well underweigh. Nature's processes are apt to be gentle, and her governments mild. The force that resides in crude oil, is manageable, and will obediently respond to the rein, if the right principle of guidance be understood and observed. These requirements seem severe. Let us see if they cannot be met.

Let there be set upon the floor of the fire-chamber (made air-tight) certain very shallow cast-iron pans or receivers (one or more as needed), of sufficient length to reach from side to side, when set cross-wise. Let these recievers be provided with heavy, closely fitting, perforated cast-iron plates, lying upon shelves but half an inch raised from the bottom. Let the oil-pipes lead from beneath, up to the centres of these pans, allowing the liquid fuel to float in under the perforated plates, and arise to their surfaces.

To prevent overflow, let the pipe from the main tank be intercepted on its way to the furnace, by an automatic valve, attached to a small cylinder in which the oil shall reach a certain height only. So set the cylinder that when it shall be as full as the valve will allow, the oil therein will lie at the exact level of the plate-surfaces, within the furnace. Run the feed-pipe from the bottom of this cylinder under and up into the receivers.

Arrange a bridge-wall back of the receivers, high enough to detain the flame until it can be supplied with all the air it needs to insure good combustion. Admit no air except from the front and let the long narrow aperture that admits it run level with the plate-surfaces (the furnace-floor being of the same level), from side to side giving equal draught to the entire burning table within.

If, to begin with, there be no blast attainable (as with a cold boiler), simply allow oil to run through the automatic valve to the cylinder and on to the receivers, upon whose plates a lighted torch lies waiting. Instantly upon arrival, the fire will start, there being a very small quantity of oil distributed over a very large surface. Let it feed automatically, being re-supplied from the cylinder in the exact quantity given by the automatic valve which permits no over feeding. When a few pounds of steam are obtained, the use of a very little will furnish sufficient air-blast to insure good combustion. Previous to applying blast, there will be a moderate amount of smoke and some deposit of carbon, which will however clear away as heat rises, until, if the blast-pipes be properly set, it will be found possible to run night and day for a week at a time on Bradford oil, without stoppage from accumulation of carbon, provided the oil be reasonably fresh. If it shall have been long from the wells, steaks of carbon may gradually gather upon the surfaces of the plates so that it might be well to spend ten minutes time in removing them and substituting fresh ones,—for they are so arranged as to be removable without trouble.

But says the skeptical experimenter, who has spent much time and money in endeavoring to burn crude oil or its lighter products by means of direct-feeding without stoppage from residuum: "What becomes of the thick oil *under* the plates?"

Pardon me, you will find none there!

To return to our description, it will be found that while automatic supply is important at the very beginning of work, in order to prevent overflow, it will not suffice further on when draught is strong and the amount of oil required is more than can be so furnished. Let there be a device therefore attached to the cylinder and connecting with the valve-rod, by which the operator can regulate the flow of oil with absolute precision, so that not one drop more (nor less) than is needed shall pass on to the recievers.

The experienced furnace-man will understand that the perforated plates must become well-heated, although the draught will be constantly carrying off the surplus flame; and one who understands the nature of crude oil will readily believe that, entering under these hot plates, it will instantly atomize and rush up through all the perforations, pell-mell, gases, hydro-carbons and all, leaving nothing beneath.

This is how crude oil can be burned safely, simply, effectually.—And economically?

I am willing to let any one who wishes to test the economy of my method (which is patented), decide for himself, provided I can supervise the test with him. My testimonials, voluntarily given by those who have used my burners in connection with boilers, are open to inspection, and may be seen at the office of the TRADE REVIEW.

As yet I have tried but one iron-heating furnace, and that under very unfavorable conditions. I heated that one successfully, the economy in firing up being very marked. But eight times I found myself obliged to stop before much work was done, on account of the excessive heat of the brick arch above my burning-plates, which radiating back upon them caused the atomized oil to catch fire within the perforations instead of above them. This caused clogging, and clogging was at once followed by melting of the plates. It then occurred to me to protect my burners by a water-lined arch instead of a brick one, and by giving some additional blast near the bridge-wall create the higher heat farther on in the furnace. The arch proved completely successful, but the trial of the blast had to be deferred. It will be but justice to myself to explain that the furnace (built upon an old English plan, and seldom used) connected, by a crooked flue, with a chimney which gave direct draught to two other furnaces. The superintendent of the mill informed me that fully 1½ tons of coal were required to heat it ready for work. I can honestly say that I accomplished that result one morning in 2½ hours, with not more than 60 gallons of oil. But under the circumstances, I could only demonstrate the practibility of my method (which I did), leaving the question of economy for future decision. As there were but two rolling-mills in the city where this experiment was tried and one of them idle, under the advice of certain prominent iron-factors there, whose addresses I am at liberty to give. I came to Cleveland, hoping to have better advantages afforded me here, than it would be possible to secure there.

As I have shown, my apparatus is quite inexpensive; and my method exceedingly simple. Shall I be held responsible for the blunders of former experimenters? or shall I have my opportunity to prove that the process I have so laboriously perfected is what I claim for it: safe, simple, effectual, and worthy of trial and adoption?

CLEVELAND'S ORE DOCKS

And the Coal and Ore Regions of the Mahoning and Shenango Valleys.

To the courtesy of Chief Engineer Latimer, of the New York, Pennsylvania & Ohio Railroad, than whom there is no more intelligent or progressive engineer in the country in his special line, we are indebted for the receipt of two maps lately completed under his direction. The first shows the company's facilities for handling coal and ore in this city; the second gives a detailed view of the blast furnaces, rolling mills and coal banks of the Mahoning and Shenango valleys. The total length of coal docks controlled by the company in this city is 1,885 feet, or over one-third of a mile. Their total dockage for ore is 3,090 feet, or 450 feet over half a mile, as follows:

Formerly leased to Cleveland Rolling Mill Co.	540 feet
New Dock	320 "
Bought of Andrews & Hitchcock	350 "
Ore	1550 "
Warehouse dock	330 "
Total	3,090 "

The total dockage for coal and ore now controlled by this company will therefore be seen to be 4,975, or a mile lacking only 305 feet. At present 2,760 feet are used for handling ore. Their plant for loading and unloading is of the very best description. At their coal docks Murgatroyd's Transmitter has lately been put into successful operation, and at their ore docks can be seen a fine plant of Brown's hoisting and conveying machinery. The company has been at heavy expense in reaching and making available the long frontage of the Cuyahoga River, but the wisdom of its plans is shown by the immense business which it does in these two chief commodities of Cleveland commerce.

The map of the Mahoning and Shenango valleys is most complete and must be invaluable for the study of consumers and railroad men. It traces the routes of the several railroads penetrating this teeming iron and coal region; locates not only every coal mine, blast furnace and rolling mill, but even the abandoned mines, and finally gives sectional views of the leading mines showing their depth and the nature of the material through which they penetrate in reaching coal.

Still another map, just prepared under Chief Engineer Latimer's supervision, is one showing every siding, crossing, tank, coal shute, curve, depot, freight house, etc., on the line of the N. Y., P. & O. Railroad. In this the acme of detail seems to have been reached, the map being a marvel of painstaking work.

Steamer City of Mackinac.

The new Steamer City of Mackinac, of the Detroit & Cleveland Steam Navigation Co's fleet, is nearly ready for business and will make her first trip to Mackinac Saturday, August 11, leaving the company's wharf, foot of Wayne street, Detroit, at 11 P. M.. Enquiries concerning her have been coming in for more than a month, and there are already 60 passengers located for this first trip. Her second public trip will be made Saturday, August 18, and regularly thereafter every Wednesday morning at 9:15 and every Saturday night at 11 o'clock. She is the finest steamer yet produced by this enterprising company. Her cabin furniture is on exhibition in the show windows of Peck, Winterhaulter & Co., Furniture Manufaciurers, Woodward avenue, Detroit. Berths can be secured at the general passenger office, foot of Wayne street.

Railroads and Telegraphs.

To offset Vanderbilts capture of the Connellsville coke region roads, the Sherrick's Run Railroad Co. was incorporated at Harrisburg last week. Prominent capitalists are pushing it.

Referring to the railroad earnings for July, the Railroad Gazette includes the Cleveland, Akron & Columbus in the list of 21 roads showing larger earnings per mile this year than ever before.

Work on the Olean & Salamanca, which is the connecting link between the Buffalo and Pittsburgh divisions of the Buffalo, New York & Philadelphia, is progressing rapidly. Over 800 men are busily at work.

The Pittsburgh Locomotive Works have contracts for 45 locomotives, 13 of which are for the Pittsburgh, McKeesport and Youghiogheny railroad, and the remainder divided between the Cleveland, Pittsburgh and Toledo, the Maryland Central Pittsburgh and Western, and other roads.—[American Manufacturer.

The Postal Telegraph Co. are about ready to receive business at Cleveland, waiting only to secure a suitable office. The route East through Boston, Portland and Bangor to the Provinces is being surveyed, and will be built immediately, as will also an extension from Chicago to St. Louis, and probably from either New York or Cleveland to Cincinnati, has recently signed a contract with the American, British and Continental Cable Company, in which both companies are bound by heavy forfeitures not to sell or lease to or cooperate with the Western Union Telegraph Company, or the present cable companies.

The certificates of the Boston Car Trust Association and the Cleveland Terminal Trust Association (Connotton Valley Railway) will soon be ready for delivery to the subscribers. Both classes of certificates bear 8 per cent. interest, and the principal is payable in yearly installments, the property covered by them becoming the property of the company when the payments are completed. The Car Trust subscriptions amount to $40,000, and the last installment is payable in 1889. The Terminal Trust subscriptions were $281,400, and it will be closed in 1890, if the payments are made as agreed.

Paint for Protecting Iron.

Among all things that require the most protective paint for iron, are carriages, farm wagons, plows and agricultural implements, from which fact it seems feasible that manufacturers of the like ought to be able to give the best information required. Any mineral paint would answer the purpose much better, and I maintain that the paint that most effectually protects iron is red lead. Not in color is it as well suited, but that is only a secondary consideration, and easily overcome by painting it over with any color desired. It contains the following advantages for the preservation of iron, which is the main object to be gained:

1. Dries easily with raw linseed oil, without an oil-destroying drier.

2. After drying it remains elastic, giving way both to the extension and contraction of the iron without causing the paint to crack.

3. It imparts no oxygen to iron, even when constantly exposed to damp—a fact to which all farm-wagon makers can testify.

4. It hardens where it has been spread thickly, without shrivelling, forming the toughest and most perfect insoluble combination of all paints. As proof of this assertion, it is used by calico printers for red-figure prints, holding out against soap and water; by gas-pipe fitters, as the best paint to resist ammonia and tar; by the English iron ship builders, for painting the hulls of iron ships—namely: two coats of red lead and two of zinc white; by wagon and plow makers, for painting wagon gears and plows; by knowing carpenters, for painting wood that comes in contact with damp brick in walls, as it preserves wood from rot, insects, etc.

For those among us who are uninstructed how to mix pure red lead for paint, it should be made known that pure red lead powder, after being slightly pressed down with the finger, shows no lead crystals. When they are visible it is merely partly converted, and not first quality. It should be ground in pure linseed oil, and, it possible, used on the same day to prevent it combining with the oil before it is applied, losing in quality. No drier is necessary, as in the course of a few days the oil forms a perfect, hard combination with the lead. American linseed oil is as good as any imported, where the manufacturer has given it age, and not subjected it to heat, as is the custom, by steaming it in a cistern to qualify it quickly for the market. It deteriorates in quality when heated above 160 deg. F. This red lead paint spreads very easily over a surface, and the best of finish can be made with it, even by a novice in painting.—[Carriage Monthly.

Ward's Window and Roofing Joint.

A very fair representation of the window and roofing joint recently patented by Wm. Ward, of Cleveland, and heretofore fully described by the Trade Review, is given in this issue. Its application to both glass and slate is clearly shown, demonstrating its value for greenhouse purposes, as well as for slating roofs. The diagram marked A shows a general view of the the joint; B, a sectional view; C, the metal cap fitted over the frame, and D, the appearance of the panes or slates after being fixed in place by the joint, puttied and fitted with the cap. It will be seen that that the joint can be applied to either vertical or inclined surfaces, with thick glass, slate or tile.

WARD'S WINDOW AND ROOFING JOINT.

Messrs. J. F. Ryder, Wm Flood, and J. T. Watterson unite in the following testimonial: "We have used Ward's Patent Metal Joints in our skylights, and they give perfect satisfaction. We regard their application as a valuable improvement, as they allow neither dust, wind nor water to penetrate, and add strength to glass." Reference may also be had to the Union Depot, A. H. Stanley, greenhouse, Paddock Bros., greenhouse, and numerous others.

A splendid article of fire clay has been found on the farm of Mr. Browning, four miles south of the city, along the line of the Valley Railway. Mr. Browning has leased the privilege to mine it to the Valley coal company, which will in all probability make preparations to make fire brick.—[Canton Repository.

Influence of Railroads on Magnetic Storms.

The Mechanical News calls attention to the fact that "Mr. Richard Proctor makes a strange suggestion in a late number of his paper, to the effect that the spreading of so large a quantity of iron upon the surface of the earth as modern science is doing is likely in the future to exercise a very decided influence of its own upon electric currents and magnetic storms, and in this way to exercise a very material meteorological influence. The network of railways and the substitution of iron for wood all over the country is going on steadily, and in a rapidly increasing ratio. Even the Western prairies are being netted in all directions by wire fences, and in calling attention to this fact Mr. Proctor thinks that here is a problem that science will shortly be called upon to solve."

Without wishing to detract any from credit due to Mr. Proctor for any discoveries or suggestions that may have originated with him, we must say that the above idea, if it may be so designated, is a very late one, and has been anticipated in more ways than one. It has been some years since attention was called in print, in this city, to the change in the storm range and the variations in the directions and effects of the electrical currents consequent upon the extension of the iron bands and steel wires across the continent. The protective power of the masses of wire overhead in large cities is as well known as is their obstructed agency in other particulars; and if the wires, why not the rails? One of the greatest advertising points of iron roofs has been the fact of their conductivity, while so far as the earth currents are more directly concerned, the futility of many of the experiments made to introduce underground conduits has conclusively shown the close affiliation of the more conductible current for the encased metals. Mr. Proctor is good in expression, but rather behind with his possibilities of the future.—[Water Gas Journal.

Tools Used in Building the Pyramids.

During a residence of two winters in a tomb at Gizeh Mr. W. M. Flinders Petrie collected evidence showing that the tools used in working stone 4,000 years ago were constructed with a jewel as the cutting edge. He stated his reasons for coming to this conclusion in a paper read before the Anthropological Institute, a resume of which is published in a recent issue of Engineering, of London. Solid and tubular drills, straight and circular disk saws, and lathe tools were made with jewels set in metal. The lines of cutting on a granite core made by a tubular drill form a continuous spiral, the grooves being of a uniform depth and width throughout, showing that the cutting point was not worn as the work advanced. The regular taper of the core would indicate that jewels were also set upon the outside and inside of the drill, thereby facilitating its removal. In some specimens of granite the drills sank one-tenth of an inch at each revolution, and the pressure necessary to do this must have been from one to two tons. The skill of the workmen and the capacity of the tool are illustrated by the clean path through both soft and hard material—no difference in the groove being perceptible, although it passes from a soft substance into quartz, subjecting the tool to an enormous strain. In plane surfaces the depth and width of the cuts indicate the successive stroke of a saw, and the use of the circular saw is proved by the regularly curved lines. The forms of the tools were the same that experience has sanctioned at the present time.

The scarcity of the diamond and the lack of strength in the sapphire and beryl lead to the consideration of corundum. Nothing has been found about the metal of which the tool was made or the method of setting the jewels.

The Amalgamated Association of Iron and Steel Workers numbers at present about 51,000 men, 28,000 of whom are skilled workmen, and 23,000 helpers and other hands.

Market Review.

OFFICE OF TRADE REVIEW AND WESTERN MACHINIST.
CLEVELAND, FRIDAY EVENING, August 10, 1883.

IRON ORE.

There has been considerable selling the past week but in smaller lots. The steel mills are well supplied, and the furnaces are returning, for the time being at least, to the hand-to-mouth policy. The receipts the past week have been 41,343 tons, against 44,455 tons last week. The shipments have increased to 29,984 tons from 18,488 tons the week before. Freights continue unchanged, ruling at $1.15 from Marquette to Ohio ports. We lower our quotations on No. 1 Bessemer from $7.50a8.00 to $7.00a7.50. Following are prices f. o. b. at Cleveland:

No. 1 Specular and magnetic Bessemer Ores per ton	$7.00@ 7.50
No. 1 Specular (non-Bessemer) ores per ton	6.50@ 7.00
Bessemer Hematites	5.00@ 5.25
Non-Bessemer Hematites	4.25@ 4.75
Menominee Range Bessemer	6.25@ 6.75
Menominee Range non-Bessemer	4.50@ 5.00

In a vigorous card to the Engineering and Mining Journal correcting some statements of the Lake Superior correspondent, "Specular," Mr. E. C. Pechin, of this city, makes the important statement that on July 1, at least 1,250,000 tons of ore had been placed through Cleveland commission houses. "At this date (July 23,)" he adds, "it is quite within the limits of safety to say that this has been increased to a million and a half of tons. To July 11, 685,585 tons had been brought down, and at this rate by November 11, we shall have a movement of hard on to a million tons larger than any year in the history of the trade, except 1881 and 1882. Some of the mines are entirely sold up, and are refusing orders. So far from the companies, as a rule, bringing down ore which is unsold, exactly the contrary in the case; nine-tenths of the ore down is sold, and a large daily movement of ore from the docks to consumers is going on." This is a somewhat roseate view of the matter, but it is the way we have heard several prominent ore men talk of late.

IRON.

PIG IRON.—There has been a fair movement the past week, at present prices, with a somewhat firmer disposition on the part of dealers. Some orders of from 500 to 1,000 ton lots have come in, for future delivery, two months being the rule. Stocks in the hands of consumers are low, but production is going on at too rapid a rate to give much hope for an immediate improvement in the tone of the market. Some dealers, however, still predict an active market this Fall. We add to our quotations a brand of charcoal iron that has an extensive sale in this market, viz.: "Arnold" American Scotch. Present prices in Cleveland are as follows (four months):

CHARCOAL PIG IRON.

No. 1 Lake Superior charcoal	$24.00@25.00
No. 2 Lake Superior charcoal	24.00@25.00
Nos. 3 and 4 Lake Superior	25.00@27.00
Nos. 5 and 6 Lake Superior	24.00@26.00
Nos. 1, 2, 3, 4, 5, Salisbury	35.00@37.00
Southern Car Wheel	28.00@33.00
No. 1 "Arnold" American Scotch	24.00
No. 2 " " "	23.00

BITUMINOUS AND COKE IRON.

No. 1 foundry, all lake ores	$21.50@22.50
No. 2 same	20.00@21.00
No. 1 foundry, lake ores, with cinder mixture	20.50@21.50
No. 2 same	19.50@20.50
No. 1 foundry, native Ohio ores	21.00@22.00
No. 2 same	19.00@20.50
No. 1 silvery, native Ohio ores	21.00@22.00
No. 2 same	18.00@20.00
No. 1 gray forge, red short	19.00@20.00
No. 1 gray forge, neutral	18.00@18.50
No. 1 Bessemer	22.00@23.00

CINCINNATI.

[Reported for the TRADE REVIEW by E. L. Harper & Co.]

The market is steadily improving, and a spirit of confidence and comfort that has not been experienced for some time prevails. Many of the furnaces decline orders for extended future deliveries at prices current. Buyers experience no difficulty in securing what irons they require for immediate consumption at satisfactory figures except for standard No. 1 Coke Foundry and reliable No. 1 softeners which are perceptibly scarce, orders for these quickly taking up the irons as they are produced. The mills are fairly active, and many of them well supplied with orders. Prices for crude and manufactured irons are well sustained. We quote as current market figures (4 months):

Foundry—Hanging Rock Charcoal, No. 1, $23 75@$24 75; Hanging Rock Charcoal, No. 2, $22 75@$23 25; Strong Neutral Coke, No. 1, $19 50@$20 50; Strong Neutral Coke, No. 2, $18 00@$19 00; American Scotch, No. 1, $18 50@$19 00. Grey Forge—Neutral Coke, $17 00@$17 50; Cold Short, $16 50@$17 00. Car Wheel and Malleable—Hanging Rock Strictly Cold Blast, $28 00@$28 75; Hanging Rock Warm Blast, $24 00@$24 50; Lake Superior, 1 and 2, $25 50@$26 00; Lake Superior, 3 to 6, $26 00@$27 00; Southern Car Wheel Strictly Cold Blast, $28 00@$29 00.

[Reported for the TRADE REVIEW by Rogers, Brown & Co.]

A fair average business at unchanged prices is a summary of the pig iron market for the week. Several mill iron orders have been closed at slight concessions and some considerable contracts for Southern coke iron at the equal of $19 cash at Cincinnati for No. 2 Foundry. Other offers at a shade below this have been declined. Offers for Alabama mill iron a shade below $17.50 cash at Cincinnati have also been refused, the furnaces declaring their purpose to blow out rather than go below these figures. On strong open foundry irons and good softeners there is a noticeable scarcity, and prices have a stiffening tendency, though buyers show a determined opposition to the least advance. The tone of reports from foundries and rolling mills is not altogether encouraging, though some foundries report an increase of work. Mills have plenty to do but prices are too low to permit of profits, unless in exceptional cases. Reports from Northern furnaces indicate a change in the policy of holding off from buying Lake ore. Some large orders have been placed recently. We quote for cash:

Hot Blast Foundry.—Hanging Rock Charcoal, No. 1, $23 50@$24 50; Hanging Rock Charcoal, No. 2, $22 00@$23 50; Southern Charcoal, No. 1, $22 00@$23 50; Strong Coke, No. 1, $20 00@$21 00; Strong Coke, No. 2, $18 50@$19 50; Strong Coke, No. 3, $18 00@$18 50; Soft Stone Coal, No. 1, $20 00@$20 50; Soft Stone Coal, No. 2, $18 00@$19 00. Forge—Strong Neutral No. 1 mill, $17 00@$17 50; Cold short No mill, $16 00@$17 00. Car Wheel & Malleable—Hanging Rock Cold Blast, $31 00@$33 00; Hanging Rock Warm Blast, $25 00@$27 00; Southern Car Wheel Iron, $26 50@$27 50; Lake Superior Car Wheel Iron, $25 00@$26 00: Lake Superior Malleable Iron, $25 00@$26 00.

CHICAGO.

[Reported for the TRADE REVIEW by A. B. Meeker & Co.]

There is a good general demand for all kinds of Foundry Iron. We quote today (Aug. 7):

Lake Superior Charcoal, 1 & 2, $24 00@$25 00; Lake Superior for Car Wheels, No. 3, $24 00@$25 00; Lake Superior for Car Wheels, 4 and 5, $25 00@$26 00; Scotch, according to brand, No. —, $26 00@$27 00; Hanging Rock, Charcoal, No. —, $24 00@$26 00; Hanging Rock Coke, No. —, $23 00@$25 00; Anthracite, No. —, $23 00@$25 00; Anthracite, No. 2, $22 00@$24 00; American Scotch, No. —, $26 00@$26 00.

WROUGHT PIPE.—It looks this week as if prices had struck bottom. There is a firmer feeling than has prevailed for the past ten days, and orders are not now placed on as favorable terms as heretofore. The prospects are good for a gradual advance in prices, probably not before September 1. Stocks are much broken. The pipe mills are running full-handed, with plenty of orders. There is no change in prices of fixtures or plumbers' supplies.

RAILS.—The steel rail mills are kept busy by small orders, at $42 asked and given, but the demand is light to what it ought to be. A new demand for iron rails for use in mines and on street railroads is noted. Old rails are nearly stagnant, at $20.00 for steel and $22.50 for iron.

MANUFACTURED IRON.—Bar iron is reported moving off a little better. Prices are generally steady at the prices quoted, but there is some shading.

HARDWARE.

Trade continues about the same, with no great demand as yet for Fall and Winter stocks. There seems to be an impression among jobbers and small dealers that, owing to the practical failure of the wheat crop, a conservative policy is best. It is not, therefore, anticipated that the country dealers will this Fall buy in excess of actual wants. The demand for shelf goods is fair only. Collections continue slow.

NAILS.—Stocks are light, and prices are firm at $3.00 rates.

MACHINERY OILS.

Demand is not active. Prices are steady, but there is little animation in the market.

COAL.

The market continues steady. July receipts were 9,989 tons anthracite, 159,109 tons bituminous, and 12,090 tons coke. Shipments from Cleveland to Chicago during July were 26,417 tons. Freights show an upward tendency, in view of the probable shortness of the season. Rates to Milwaukee are 50a55c.; to Chicago, 65c.; to Detroit, 35c.; to Ogdensburg, $1.50; to Duluth, $1.

LUMBER MARKET.

PLANK—MIXED WIDTHS, 1¼ AND 1½ INCH.

A 1 & 2..$50 00 A 3..$40 00 B..$32 00 C..$21 00 D..$14 00 E..12 00

2-IN. 12, 14 AND 16 ft., TOGETHER.

A 1 & 2..$48 00 A 3..$40 00 B..$32 00 C..$21 00 D..$14 00 E..13 00

BOARDS—1 IN. MIXED WIDTHS.

A 1 & 2..$45 00 A 3..$36 00 B..$30 00 C..$20 00 D..$15 00 E..12 00

STOCK BOARDS—12 IN.

A 1 & 2..$45 00 A 3..$36 00 B..$35 00 C..$20 00 D..$15 00 E..12 00

STRIPS—6 IN.

A 1 & 2..$42 00 A 3..$ ... B..$35 00 C..$22 00 D..$17 00 E..12 00

FLOORING, SIDING AND CEILING.

Matched flooring.....A 3, $42 00 B, $38 00 C, $24 00 D, 20 00
Matched drop siding, 6 in. A 3, $42 00 B, $38 00 C, $24 00 D, 18 00
¼ in. bevel siding.....A 1 & 2, $24 00 A 3, $20 00 B, 18 00
Beaded ceiling $2 higher than flooring.

BILLSTUFF.

Small joist, 12, 14 & 16 ft. $18 00 | Small timb'r, 12,14,16,18 ft 14 00
18 ft .....$13 00@$14 00 | larger than 8x8, special.
Long timber 20 ft. and over, add about $1 per ft. to the price of short.

SHINGLES, LATH AND MILL WORK.

Shingles, XXX, 18 in.....$4 25 | S, 1 S, $1.00; S, 2 S $1 50
clears or clear butts.. $2 50@$3 00 | Matching, flooring and
Lath .....$2 75 | drop siding.....$2 00@$2 50

ANOTHER successful trial with a electrical street car has been made in Paris. It made the difficult trip from Trocadero to the Louvre and thence to Place des Nations by the Bastille, to show what could be done with bad grades.

THAT STEEL NAIL SYNDICATE.

What Has Become of a Much-talked-of Project.

Readers of the TRADE REVIEW will recall an article in these columns last December relative to the formation of a syndicate of eight nail mills in and around Wheeling, W. Va., with the understanding than a plant should be erected, with a capacity of 500,000 tons of low carbon steel per annum. Each of the mills represented was to receive a certain part of each day's output of steel to be determined by the number of machines employed in the mill. Each mill was also to contribute pig iron to the steel works according to its capacity; and purchasing the output of the steel works the mills were to allow the syndicate a small profit on the manufacture, something like a dollar a ton, but of course the mill owners were to get this finally in the shape of dividends. Concerning this syndicate the Pittsburgh Telegraph has gotten hold of the following recent facts: The syndicate seemed for a time to be an established fact, and it was reported that it had begun to negotiate for machinery and would break ground for the new steel works January 1, 1883. But unhappily affairs did not roll along smoothly, and the only converter that was operated was a fanciful one which converted harmony into dissatisfaction—which was entirely different from the original intention of turning pig into low steel. A serious question arose, the big fleas did not want the little fleas to grow, and the little fleas declined to guarantee that they would remain dwarf vermin. Shall the smaller mills be allowed to increase their capacity, as was desired by their owners should steel nails become a commercial success? There was a serious division on this conundrum and the syndicate resolved into its natural elements, namely, independent mills for the manufacture of iron nails. Yet the project to make the "coming nail" of steel has not fallen through entirely, for at this time there are two leading firms at the late lamented headwaters of the Ohio that are committed to the expenditure and labor of erecting complete steel nail plants, and another is said to have similar action under advisement. When these enterprising establishments shall demonstrate the commercial feasibility of their object, no doubt the two large Bessemer plants in the Pittsburgh district will receive home orders sufficient to render their owners' happiness not at all dependent on a good market for rails.

Improving Blast Furnaces.

Mr. William Kent, C. E., formerly of Pittsburgh now of New York, has received a patent for an improvement in the construction of blast furnaces, which dispenses with the ordinary double walls, substituting in place a single wall, surrounded by a skeleton of upright bars and bands. Each band is provided with a spring joint making it elastic and free to expand and contract with variations in the temperature of the fire brick wall. The invention allows repairs to be made from the outside, saving blowing out the furnace to do the work from within, as at present. One of Schoenberger's furnaces has used the device for three years past with great success.

Importance of Small Industries.

Speaking in Congress at the last session of the need of encouraging certain relatively small industries, Senator Miller referred to the city of New York, the greatest manufacturing city in America—he might have said in the world—and "yet she has not a cotton mill, a blast furnace, or a rolling mill within her borders. Her manufactories are small," he said, "but they employ more than a quarter of a million people." It is worthy of notice in this connection that while recent patents have much to do with the means and methods of the great staple industries, such as steel and iron production, iron milling, cotton and woolen manufacture, and the like, the smaller yet in the aggregate immensely important industries are almost wholly based upon and due to the development of recently patented inventions.

COMMUNICATIONS from practical men are always welcome, and will be promptly printed.

Cleveland Wholesale Prices.

[The lowest quotable prices are given in all cases.]

HARDWARE.

Adzes.

Carpenter's.....per doz	$18 40
Ship..... " "	18 75
Heavy railroad.. " "	19 50

Axes.

	per doz.
James' 2d qual.....	$7 00
Buckeye.....	7 75
" doub. bitt.....	15 00
Hunt's.....	9 50
Mami's.....	8 00
Lippincott's Crown.....	8 50
Cut More.....	9 00
Peck's Double Bit.....	22 00
"Champion Blade.....	11 00
Good triple silver steel..	11 50

Axles.

Standard list,....
Nos. 1 to 6, 50 & 10 off
Nos. 7 to 14, 50 & 5 off
Nos. 15 to 18, 45 off
Nos. 19 to 22, 50 & 5 off

Anvils.

	per lb.
Eagle, Amer.....	10c dis 20
Wright's.....	11¼c@11c
Armitage's Mouse Hole.....	9¼c@9¾c
Trento.....	10¾c
Wilkinson's.....	10¼c

Anvil Vise and Drill.

Millers Falls Co. $28.....dis 20
Cheney Anvil and Vise dis25&2

Augurs and Bits.

C S cut augers .....dis 50&10
do do do bits.....50&10
D C gimlet do Ives..dis 50
Snells bits.....dis 40&10
Russell Jennings' augers, dis 10&10&10
Cook's pat augur.....40&10

Animal Pokes.

Akron.....	$ 3 50
Camp's.....	4 00
Berea, per doz.....	4 00
Eagle, per doz.....	6 00

Apple Parers.

Domestic&Reading ℔ doz.	$7 00
Turn Table.....	4 50

Bolts.

Machine.....	dis 70
Plow.....	dis 50
Plow, R. B. & W.....	dis 40
Cast Iron Barrel Shutter, etc.....dis	55&10
Cast Iron Chain (Sargent' list).....dis	60&10
Ives' Pat. Door Bolts.	dis 50
Wrought Barrel.....dis	55&10
Wrought Square.....dis	55&10
Wr'g't Shut'r, all iron, Stanley's list.....dis	50&10
Fire, R. B. & W., new list.....	dis 70&10
Stove, American Screw Co.'s.....	dis 40
B. B. & W.....	dis 40
Bolt Ends 16c. per lb net...	60

Bellows.

	Dis
Bl'ksmith's com new list, 50 ℔ ct	
Moulder's new list, dis 25 ℔ ct	
Hand, new list, 25 per cent	

Butts.

	Dis
Wrought brass.....	70
Cast, loose joint....	60&10
Pin, loose.....	55&10
Wrought, fast joint narrow.....	50&10
Wrought fast joint broad.....	50&10
Wrought loose joint broad.....	55&10
Wrought table and back flaps.....	50&10
Loose joint, without acorns.....	55&10

Ten per ct. extra dis for cash.

Boiler Plates.

"Gaylord"–Standard Quality.

C. No. 1.....	4 50
C. H. No. 1 Shell.....	4 75
C. H. No. 1, 50,000.....	5 25
C. H. No. 1, 55,000.....	5 75
C. H. No. 1 Flange.....	6 50
Firebox.....	
T. S., 60,000.....(as per)..	6 50
T. S., 65,000.....(act of)..	

Homo. Steel, 70,000 (of Cong) 7 50
Heads, ¼c ℔ lb. extra.
N.B.–Eastern brands of boiler plate at from 2-10 to 3-10c ℔ lb less than above prices.

Boiler Tubes.

"National" Standard Gauge 1 inch to 10 inch.....dis 37½
"National" Standard Gauge 11 inch to 15 inch.....dis 25
"National" Special Locomotive Tubes.....net list

Bag Holders.

Sprengle's Pat, $18.00 per doz 40 per cent. dis.

Boiler Makers' Tools.

Doty's Power Shears..net list	
" Hand Lever Shears.net list	
" Power Punch.....net list	
" Hand Punch.....net list	
Steel Screw Punch.....net list	
Iron Screw Punch....net list	
Boiler Plate Rolls.....net list	
Buffalo Forges & Blowers dis 20	
Watson's " " net list	
Spring Tube Expander..dis 15	
Roller Tube Expander.net list	
National Tube Cleaner.dis 20	
Wire Flue Brushes....net list	
Anvils–'Peter Wright' 12½ ℔ lb	
Solid Box Vises net list	

Cleveland Stamped Elbows

Genuine Russia Iron

4½ inch, per doz.....	5 50
5 do do	7 50
6 do do	9 50
7 do do 11	00

Charcoal Iron

4½ inch, per doz.....	2 50
5 do do	3 50
6 do do	4 25
7 do do	5 50

Planished Amer. Russia Iron

7½ inch per doz.....	5 00
4 do do	6 50
5 do do	9 50
6 do do	8 05

Discount 33⅓ per cent

Chisels.

Hot and cold cutting...℔ lb	30
Railroad track.....	30
Machinists.....	30
Mallet head.....	50
Tape.....	50
Packing.....	50
Stone cutters.....	50

Crowbars.

Cast steel.....	℔ lb 7
Iron, steel points.....	5c

Cutlery, Pocket and Table.

Meriden Cutlery Co., table net
Am. Miller Bros.' Cutlery Co.....dis 25
Humason & Beckley, pocket 33⅓
Naugatuck Cutlery Co. list net
Aaron Berkenshaw's pocket dis 25
Fram Cutlery Co., table net
Cleveland Cutlery Co...dis 25
Miller Bros., pocket.... 33⅓
Akron Cutlery Co.....dss 45

Coopers' Tools.

Bradley's.....	dis15@20
Braton's.....	dis15@20

Chains.

Coil by cask.

5-16	⅜	7-16	½
9	8	7	6¾	6¼

Drills and Drill Stocks.

Blacksmiths', each $2.50 dis 10
Blacksmiths', self-feeding, each 7.50 dis 20
Breast, P. S. & W ...dis 20&10

Drawing Knives.

Peck, Stow & Wilcox...dis 70
Witherby's.....dis 65@10
Nobles Mfgr. Co..... 15
Adjustable handle..... 20

Emery and Sand Paper.

Regular Numbers.....℔ lb	6c
Flour and F. F.....℔ lb	4c
B. & A. Emery Paper...dis	35
Sand paper.....dis	35

Enameled & Tinned Ware.

Kettles.....dis	50
Sauce Pans.....dis	30
Tinned Sauce Pans.....dis	30

Files.

Parkin's $5 to £...dis 45 ℔ cent
E.M. Boynton's, new list dis 25
J. & Riley Carr.....4.50 to £.
Johnson & Bro.....dis 50
Butcher's.....4.50 to £.
Walter Spencer & Co.'s "Diamond".....4.50 to £.
Fisher's.....4.75 to £.
Moss & Gamble.....4.50 to £.
H. Disston & Sons (new list).....dis 45 per cent
Heller Bros.' Horse Rasps.....dis 35
Nicholson.....dis 45
New American.....dis 45
Union File Co.....dis 45

Grindstones.

Berea.....1@1½	℔ lb
Ohio.....1½@1⅞	℔ lb
Nova Scotia.....1¼@1¾	℔ lb
Lake Huron.....1@1¼	℔ lb

Hammers.

Maydole's.....dis	15
Cheney's.....dis	25
Hartford Hammer Co.....dis	20
Humason & Beckley.....dis	50
Verree.....dis	5

Magnetic Tack, Nos. 1, 2, 3, $1.25, $1.50 and $1.75, dis 25&10
Nelson Tool Works..dis 40&10
Warner & Noble's.....dis 5
Kip's.....dis 15

Hatchets.

Buckeye.....Shingling,
Nos...1, 2, 3,
℔ doz $7 50, $8 00, $8 50, dis 40
Claw,
Nos...1, 2, 3,
℔ doz $8 25, $8 75, $9 25, dis 40
Lathing,
Nos.....1, 2, 3,
℔ doz $7 50, $8 00, $8 50, dis 40

Hinges.

Champion double acting spring hinges.....dis. 30
Screw & Strap 8@12 in...$5. net
Gravity Locking Blind Hinges, Sargeant & Co. 70&10
Clark & Co.....70&10

Locks.

Whipple Mfg Co.....	50 & 5
Norwalk Lo Co.....	45&10&10

Nails.

20 to 60d.....	$3 00
8 and 9d.....	25
6 and 7d.....	50
4 and 5d.....	75
3d.....	1 50
2d.....	2 75
3d fine.....	3 00
2d fine.....	3 75
⅞ inch.....	3 00
4d barrel.....	1 00
1¼ inch barrel nails.....	1 50
1¼ do do do.....	1 75
1 do do do.....	2 50
⅞ do do do.....	3 00
Cut spikes, all sizes.....	35
Clinch nails, all sizes.....	1 75
Casing and box nails.....	75
Finishing nails,.....	$1 25
Tobacco nails,.....	50

Nuts and Washers

Nuts, square.....	8c off list.
Nuts, hexagon.....9c. off list.	
Washers.....7c off list.	

Nuts, Bolts, etc.

Machine Bolts.....	dis 70
Bolt Ends.....	dis 70
Boiler Patch Bolts.....net list	

Picks.

Railroad, 4 to 5 lbs.. doz	$6 60
5 to 6 lbs..	7 20
to 7 lbs..	7 80
7 to 8 lbs..	8 40
Railroad Tamping Pick.. 7 to 8 lbs..doz	10 80
Mill Picks per lb.....	75c

Planes.

Ohio Tool Co.....dis	20
Sciota.....dis	25
Bailey's Pat. Adjstbledis	20@10
Sandusky, fancy.....dis	15
Buckeye.....dis	20
Ogontz.....dis	25

Rivets.

on.....dis	40
inned.....dis	40
opper.....dis	50

Rules.

Stanley.....dis. 70 & 10

Squares.

	D. s
Steel or iron, case lots.....	50
Try squares and T bevels....	40

Spikes—WROUGHT

All lengths by ¼ inch.....4½c	
do do do 5-16.....	8½
do do do ⅜, 7-16 & ½ in	8¼

Shovels and Spades.

Ames' new list, July 1, 1881,.....dis 15
Old Colony.....dis 15
Remington's (Lowman's Patent).....dis 30
Bishop.....dis 50
Chisholm.....dis 25@30
Rowland's.....dis 50
Griffiths.....dis 50

Sad Irons.

From 4 to 10 lbs.. per lb 3 net
Self-Heating.....℔ doz $9 net
" Tailors..℔ doz $18 net
Gleason's Shield and Toilet.....dis 25
Mrs. Pott's Irons, double pointed.....dis 35
Mrs. Pott's Irons, square back.....dis 35
Enterprise Star Irons.....dis 35
Combined Fluter and Sad Iron.....℔ doz $15, dis 15

Saws.

Disston.....dis	20
Disston's Circular.....dis	40
Disston's hand panel, rip, &c.....dis	20
Boynton's lightning cross cut new list.....dis	40
Boynton's circular and mill.....dis	40
Boynton's ice.....dis	25
Boynton's lightning hand panel and rip.....dis	25
Livingston's butcher and kitchen.....dis	20

Livington's framed wood
Nos. 101 102 103 104 105
doz $10 8.50 10 7.50 6.20 net
Peace circular & mill...dis 40
Peace hand panel and rip.....dis 25
Peace band saws, all widths.....dis 10

Scales.

Hatch, Counter, No. 171...
℔ doz. $42, dis 37½&10
Union Platform.....$6, dis 45
Fairbanks'.....dis 20
Buffalo Scale Co.....dis 40
Forsyth Scale Co.....dis 25
Howe's.....dis 20&10
Chatlilon's Eureka.....dis 25
Family Universal.....dis 50
Scale Beams.....dis 33⅓&10

Screws.

	Dis
Flat head iron or steel [new list] per cent dis.	55
Flat head brass.....	55
Round head iron or steel	50
Round head brass.....	45
Brass and Silver capped.	30
Japanned, list of Plain Screws.....	40
Coach, patent Gimlet point, list per 100.....	65
Lag, taper points.....	70
Bed.....	10
Machine, flat head, iron.	55
round head, iron	50
Bench, iron.....55	&10
wood, beech, per doz $3.....	10
wood, hickory.....20	&10

Tinners' Tools & Machines

Machines (P. S. & W.)....less 10
Tools (P. S. & W.)..... " 20

Plumbers', Steam and Gas Fitters' Supplies.

Wrought Iron Pipe dis 70&10
Malleable Iron Fittings.... list
Grey Iron Fittings....dis 50
Steam Brass Goods.....dis 55
Water " " .....dis 50
Ludlow Gate Valves...dis. 20
Register Gauge Cocks net 1 00
Montg'ry Gauge Cocks $1 each
Steam Gauges.....dis. 40
Steam Guages 5 in. net dial per doz.....30 00
Scotch Glass Tubes.....dis. 70
Tools.....special.
Duplex Injectors.....net.
Soil Pipe & Fittings, Mott's List.....dis. 30
Sinks, Mott's List.....dis. 25
Copper Bath tubs, Sinks, etc.....dis. 25
Galvanized Iron Boilers "Scaifes."....dis. 50
Marble Slabs, Counter-sunk net per ft.....$ 1 25

Sheet and Tank Rivets.

"Norway."

All sizes.....dis. 15

Boiler Rivets—"Albany."

⅝, ¾, 11-16, and ⅞ in. diam. 5 00

Valves.

	Dis.
Jenkins' Patent Gate Valves	35
" " Globe "	40
" Standard Packing "	20

Vises.

Solid Box, list of July 1, '79,.....dis 45
Solid "Crown" (A. H. Hilldick)....40 to 100 lb. 15c net
Solid, Peter Wright's.....15⅓
Solid, Wilkinson's.....18⅓
Parallel, Parker's.....dis 10
" Simpson.....dis 20
" Prentiss.....dis 15
Saw Filers, Hopkins' ℔ doz $17.50, dis 10
" Wentworth's.. 9 00
Reading.....dis 45&10
Cowell Hand Vises.....dis 20
Richardson's Vise and Anvil.....dis 25

Wrenches.

Coe's genuine.....	50
Girard Standard....dis 50	& 10
Mechanics' 10 and 10....dis.	50
P. S. & W. Mechanics dis 50	&10
Agricultural.....dis	70

Wire.

Brass and Copper.....dis	30
Bright & annealed, Nos. 0 @ 18 dis 50@55	
" " Nos. 19 @ 26 dis 60	
" Nos. 27 @ 36 dis 65	
Coppered Nos. 0@18, dis	45@50
Galvanized, Nos. 0@18, market list.....dis	45@50
Tinned, Nos. 0 @ 18, dis	45@47½
Cast steel.....dis	40
Tinned Broom Wire, Nos. 18 @ 25.....dis	55
Annealed Fence, Nos. 8 and 9.....dis	60
Annealed Grape, Nos. 10 to 14.....dis	60
Galvanized Telegraph, Nos. 7 to 9.....℔	1
Galvanized Telegraph, Nos 19 to 11.....℔ lb	8¾c
Galvanized Telegraph, No. 12.....℔ lb	10½c
Fence staples...℔ lb	5½@5¾c
Fence Staples, galvanized, ℔ lb	6½@6¾c
Stubs Steel Wire $6 00 to dis	30
Barb Wire, painted.....	7½8
Barb Wire, galvanized..	¾c
Crucible Steel Ropes fro ¾ in. at 9c to 1¼ in. at.....	52c
Best Selected Iron Ropes from 3-16 in. at 3c. to 1¼ in. at.....	33c

TINNER'S STOCK.

Tin.

Banca,.....per lb.	23½
Straits..... "	23½c
English..... "	23c
Bar..... "	24½c

Tin Plate.

IC 12x12 charcoal.....	$ 6 75
IC 14x20 do.....	6 75
IX 14x20 do.....	8 75
DC 12½x17 do.....	7 00
DX 12½x17 do.....	9 00
DXX, 12½x17 do.....	11 00
DXXX, 12½x17 do.....	13 00
IC, 20x28 do.....	13 75
IX, 20x28 do.....	17 25
IC, 14x20, Best Roof.....	6 00
IX, 14x20, do.....	8 00
IC, 20x28 do.....	12 00
IX, 20x28 do.....	16 00
IC, 10x14 Best Coke.....	6 00

Subject to card discount.

Solder.

Half and Half, in bars.....15	
No. 1 do 14	
Spelter Solder.....25	

Pat Planished Sheet Iron

[A].....per lb	10½c
[B]..... "	9c

Nos	10	15	21	25
	to 14	20	24 & 26	
Com	3-10	3-30	3-40	3-75
Char	5-60	5-60	6-00	6-20

Sheets over 28 in. wide ¼c extra.

Zinc.

Sheet, cask.....	6½c
Sheet, open.....	7c

BRASS.

Cash prices for Roll and Sheet Brass. For less quantity than 100 lbs. add 3c per lb.

High Brs.

All Nos not thinner than No 28, wider than 2 in. not wider than 14 inch.....30c
All Nos to No. 28 inclusive, and widths over 14 to 20 in. inclusive.....35c
All Nos to No. 28, inclusive, and widths over 20 to 30 in. inclusive.....38
½c per lb advance on each No above Nos 28 to 38, inclusive.
All Brass thinner than No. 8 is Platers' Brass at.....53c
Sheets 24x48, and all sheets cut to particular sizes and lengths under 30 inches, in width wider than 2 inches 37c

Low Brass.

4c pr lb. more than High Brass
Gilding metal 8c per lb. more than High Brass.
Platers' or Gold Metal
In Bars.....48c
Sawed.....51c
Planed or Polished...54c

For Slitting.

Metal in width in. to ⅛ in. to No. 28, inclusive, 1c per lb, advance.
Metal, in width 2 in. to 1 in. thinner than No 28, 2c per lb. advance
Metal, in width ⅛ in to ¼ in. thinner than No 28, 5c per lb. advance.
Metal ¼ in. in width and less, 10c per lb. advance.
Any of the above widths cut to particular lengths add 7c per pound.

COPPER.

Lake Ingot.....	15¼@16c
Baltimore.....	14¾@15
Arizona.....	15@15¼c

Sheathing Brazier Copper, Bolts, etc.

All sizes, 16 oz. per sq. foot, and over, per lb.....25c
" nd over per lb.....25c
Brazier's Copper, ordinary sizes, under 16 oz. and over 12 oz. per sq. foot, per lb. 25c
Brazier's Copper, 10 oz. and 12 oz. per sq. ft...per lb. 27c
Brazier's Copper lighter than 10 oz. per sq. ft...per lb. 34c
Circles less than 84 inches in diameter...per lb. 33c
Circles 84 inches in diameter and over.....per lb. 30c
Segment and Pattern sheets per lb. 33c
Locomotive Fire Box sheets per lb. 30c
Sheathing Copper, over 12 oz. per sq. ft... per lb. 24c
Bolt Copper.....per lb. 28c
Copper Bottoms per lb. 31@32c
No copper is Sheathing except 14x10 inches, and not to exceed 34 oz. to the sq. ft.

Tinning.

14x48.....per sheet 6c
All other size sheets, 2½c per square foot. For tinning both sides, double the above amount

LEAD.

Amere'n, ℔ lb.....	4¼c
Bar, ℔ lb.....	5½c
Pipe, ℔ lb 6¾c dis 10 per ct	
Sheet, ℔ lb 7¼c dis 10 per ct	
Tin-lined pipe 15c dis 10 per ct	
Block.....45c.	
Chilled Shot.....	8c

Babbitt Metal.

Babbit Metal, No. 3, 14 X....	42
Babbit Metal, No. 2, 16 XX..	46
Babbit Metal, No. 1, 18 XXX..	50
Babbit Metal, C.....	20
Babbit Metal, B.....	24
Babbit Metal, A.....	32

Dis 40 per cent.

IRON AND STEEL.

Flat Bar.

1½ to 4 by ⅜ to 1 inch.....	1 90	
4½ to 6 by ⅜ to 1 inch.....	2 00	
1¾ to 6 by 1¼ to 1½ inch	2 30	
1¼ & 1¾ by ⅜ to ¼.....	2 00	
1 & 1¼ by ⅜ to ¼.....	2 10	
⅝ & ¾ and ⅜ by ⅜ to ½.....	2 30	
Round,		
1 to 1¼ inch.....	2 00	
2 to 2¼.....	2 10	
2¼ to 3¼.....	2 40	
3½ to 4.....	2 90	
4¼ to 4½.....	3 40	
4¾ to 5.....	3 60	
Square.		
1 to 1¼ inch.....	2 00	
2 to 2¼.....	2 10	
2¼ to 3¼.....	2 40	
⅜ to 4.....	2 90	
3¾ to ⅞.....	3 00	

Heavy Band.

1½ to 6 by ¼ and 5-16 inch 2 10
1 to 1¾ by ¼ and 5-16 do 2 20
¾ to ⅞ by ¼ and 5-16 do 2 40
⅞ to ½ by ¼ and 5-16 do 2 80

Half Oval and Half Round.

Wagon box iron ¾ and ⅞ 3 50
1-10c per lb extra will be charged for cutting to specified lengths

Light Band.

1½ to 6 by ⅜ to 3-16..... 2 70

Hoops.

1¼ to 2 , Nos 16 to 18..... 3 10
1¼ to 4 do 13 to 15..... 3 00
1-10 extra for each gauge lighter

Sheet Iron.

No 22 to 24.....	3 50
No 25 to 26.....	3 70
No 27.....	3 90
No 28.....	4 30

English Steel.

Best cast.....℔ lb	16c
Extra cast.....	16½c
Round machinery..	10c
Swaged, cast.....	18c
Best double shear...	15½c
Blister, 1st quality...	13c
Refined tool steel....	16½c
Spring calking....	7¼@7½c
German steel, best..	11c
2d quality.....	10c
3d quality.....	9c
Sheet cast steel, 1st quality.....	15½c
2d quality.....	14½c
3d quality.....	13½c

American Steel.

Best brands of refined cast steel, ⅜ to 2 inches..	12c
Crucible cast.....	7c
Open-hearth ditto....	4½c
Hammer cast steel ...	9c
Spring cast steel.....	7½c
Bessemer and open-hearth spring.....	5c
Ditto plow.....	4½c
Steel boiler plate....	6½@7c
Bessemer machinery..	5 @6c
Spring and calking...	7¼@7½c
Tire.....	5
Sleigh shoe.....	5

Bessemer Steel Tire.

⅝ to 1 by 3-32.....	4½ ℔ lb
⅝ to 1 by ⅛ to 5-32	4½ ℔ lb
⅝ to 1 by 3-16 to ⅝ ...	4½ ℔ lb

Miscellaneous Cast Steel.

Auger and auger bit.....	10
Axle steel for wagons....	7
Frog points and plates....	8
Frog size bars.....	8
Pick, hammered.....	10½
Mattock, beveled.....	9
Table cutlery.....	7½
Trap spring steel.....	10
Pike and cant hook.....	8½
Coal and granite.....	9

SCRAP IRON AND OLD METAL.

DEALER'S BUYING PRICES

	Per Ton
No. 1 R R wro't scrap....	$20
No. 1 wrought scrap.....	20
No. 1 Machine cast scrap.	14
Stove plate (free from burnt iron).....	11 00
Grate bars.....	7
Pipes and flues (clean)....	15
Tank iron.....	14
Hoop and band iron.....	10
Light sheet iron.....	0
Axle turnings.....	15 00
Wro't turning (f from cast)	13
Wro't iron, oily drillings.	9
Cast borings.....	9 00
Malleable iron.....	9
Uncut wro't iron boilers..	15
Old copper per lb.....	11
No. 1 H. Brass per lb.....	11
Heavy yellow Brass do..	9@10
Light Brass per lb.....	7@9
Scrap Zinc per lb.....	2@3
Tea Lead per lb.....	3
Heavy Lead per lb.....	4

PIPE, WROUGHT.

Standard Wrought Iron Lap Welded Steam and Gas Pipe

Inside Diameter. Inches.	Plain, Price Per Foot.	Galvan. or Enameled Per Foot.	Outside Diameter Inches.	Weight Per Foot.
⅛..	08		.40	.24
¼..	08	$0 11	.54	.42
⅜..	09	12	.67	.56
½..	11	15	.84	.85
¾..	13½	19	1.05	1.13
1..	19	28	1.31	1.67
1¼..	27	40	1.66	2.26
1½..	33	47	1.90	2.69
2..	46	64	2.37	3.66
2½..	75	1 00	2.87	5.77
3..	95	1 30	3.50	7.55
3½..	1 25	1 70	4 00	9.05
4..	1 50	2 05	4.50	10.73
4½..	1 75	2 40	5.00	12.49
5..	2 25	3 00	5.56	14.56
6..	2 75	4 00	6.62	18.76
7..	3 75	....	7.62	23.00
8..	4 75	....	8.62	28.00
9..	6 50	....	9.68	34.44
10..	8 00	....	10.75	40.64
12..	12 00	....		54.65

Discount, car load lots, 70 and 10 per cent. Less than car load 70 to 70&5.

COAL,

WHOLESALE.

Wholesale f.o.b. cars at Cleveland:

Carbon Hill and Monday Creek.....	$2 50
Massillon.....	2 70@2 85
Palmyra, lump.....	3 25
Brier Hill.....	3 25@3 50
Pittsburgh.....	3 00
Salineville.....	2 00
Tuscarawas.....	2 25
Anthracite grate.....	5 40
Anthracite egg.....	5 40
Anthracite stove.....	5 49
Anthracite chestnut.....	5 71

RETAIL.—Delivered.

Massillon Lump.....	$4 00
" Nut.....	3 75
Carbon Hill and Monday Creek, lump.....	3 50
Carbon Hill and Monday Creek, nut.....	3 25
Straitsville, lump.....	3 75
Straitsville, nut.....	3 50
Palmyra, lump.....	4 25@4 50

75c less on cars by car load.

Anthracite Stove and Chestnut.....	6 50
Egg and grate.....	6 25

OILS.

Pure Oils. p'kages included

Sperm, winter bleached per gal.....	1 30@1 32
Whale, winter bleached per gal.....	62@66
Straits.....	45@50
Bank.....	45@47
Lard oil extra W S..	70@80
do No 1 do.....	68@73
do No 2 do.....	65@68
Tallow oil.....	70@75
Neatsfoot oil pure..	95@$100
do No 1.....	80@85
Linseed oil, raw.....	57@60
do do boiled.....	60@63
Cotton seed oil white	57@60
do do yellow	50@50
West Virginia lubricating 28 deg.....	15c@20c
Paraffine oil winter pressed.....	22@25
Capitol Cylinder.....	85
Model do.....	65
Eldorado Engine..	50
Turpentine, per gal..	43

GLASS.

(Per box of 50 feet)

SINGLE THICKNESS

6x8 to 10x15.....	8 00
11x14 to 15x24.....	9 00
16x24 to 20x28.....	10 25
15x34 to 24x30.....	11 25
26x28 to 24x30.....	12 00
26x36 to 26x44.....	13 50
26x46 to 30x50.....	14 58

DOUBLE THICKNESS Dis 60&20

6x8 to 10x15.....	12 25
11x14 to 15x24.....	13 75
16x24 to 20x28.....	16 25
15x34 to 24x30.....	17 75
26x28 to 24x30.....	19 00
26x36 to 26x44.....	20 75

Dis 70

Practical Mechanics.

Some Peculiar Properties of Steel.

[Continued from Page 7.]

low 900 deg. F.; then, taking the difference between the temperature of the steel and the cooling fluid, and multiplying the difference by the coefficient of conductivity of the cooling liquid, we find:

For	At a temperature of	Difference between it and 900° F.	Coefficient of conductivity.	Product.
Water	32°	868	1.0	868
Zinc	800°	100	15.0	1,500
Lead	650°	250	8.5	2,125
Tin	470°	430	14.5	6,235

According to these results it would follow that any of these metals would harden steel much more than water, which, however, is not the case. Hence it follows that the hardening power does not depend merely on the temperature and conductivity of the cooling fluid, but also on its capacity for heat and the height of its boiling point. This being so, it follows that the great hardening power of water must be explained upon the ground of its production of vapor rather than its conductivity. And this becomes at once evident when it is remembered that water in contact with metal at a temperature of from 900 deg. to 950 deg. F. cannot, under ordinary pressure, remain in the liquid state, but must be rapidly converted into steam. Therefore, the heated steel remains enveloped by a film of steam until cooled, which formation of steam renders a great deal of heat latent, thereby assisting the hardening process. From the well known fact that rapid motion of the steel greatly aids hardening under water we must further conclude that steel will be all the better hardened the more rapidly the steam formed is drawn away. With a view of accomplishing this, slow dipping, hardening under a running stream of water and finally hardening with a spray have been successfully employed, and have all given better results as to degree of hardness and uniformity than the ordinary method of hardening under water. For tempering small articles, melted metal baths, especially tin, give the best results for uniformity of hardness, and since the certainty of the temperature of the bath is an important factor in the process of hardening, their use commends them to very favorable consideration.

In softening steel, the first consideration is the purpose of the operation. If it is merely intended to draw the temper of an over-hardened piece of steel, its ultimate use will entirely decide the question. Uniform and careful heating, and good judgment, acquired by intelligent practice, are the only safe guides. If, on the other hand, annealing for the purpose of restoration of ductility is intended, then the treatment the material has received and the heat at which it was last worked become more important considerations. No specific rules applicable to all cases can possibly be laid down, and the experience and good judgement of the steel worker must be given proper scope. The general rules governing annealing may be summed up as follows: Heat slowly and uniformly the entire piece to a temperature higher than that at which the metal was last worked—if hammered or straightened cold, to a bright red. Allow cooling to take place as slowly as possible and under exclusion of air. If annealing cannot be performed in pots or muffles, annealing in dry lime or in an oil bath will give excellent results. If the steel has not been heated above dark cherry red and low in carbon, annealing in boiling water will give excellent results.—[Blacksmith and Wheelwright.

BRASS work that is so dirty by smoke and heat as not to be cleaned with oxalic acid, should be thoroughly washed or scrubbed in soda, or potash water or lye. Then dip in a mixture of equal parts of nitric acid, sulphuric acid and water; or, if it cannot be conveniently dipped, make a swab of a small piece of woolen cloth upon the end of a stick and rub the solution over the dirty or smoky parts; leave the acid on for a minute and then wash clean and polish.

INDUSTRIES OF THE CHIEF CITIES.

Some Valuable Comparisons in Which Cleveland is Interested.

Lorin Blodget, of Philadelphia, writing to Bradstreet's, calls attention to the fact that the proportion of the population in the chief cities of the country, especially in New York and Philadelphia, engaged in productive industries increases more rapidly than the simple growth in numbers. In 1870 New York had but 13¾ per centum engaged in productive industries, and in 1880 there were 227,352 persons, or nearly 19 per centum of the entire population. Philadelphia had 20 4 10 per centum engaged in productive industries in 1870 and nearly 22 per centum in 1880, as first taken, but an entirely complete enumeration would have shown more. In 1882 the number reported as being so engaged was over 240,000, or 25 per centum of an assumed population of 950,000. All the larger cities show the same rapid increase in the proportion of industrial population, comparing 1880 with 1870, or with any previous census, and these striking facts are of the highest interest, and most encouraging as regards the welfare of the countless thousands who in the absence of these industries would have no resource.

These industries themselves are also changing their form and becoming a better resource for those engaged in them. Wages are better, and the conditions of labor are less restricted. The easier conditions in this respect are very striking in Philadelphia, and probably no less so in New York. In the census year 1879 80, 227,262 persons employed in the city of New York received $97,030,021 in wages, or the very large sum of $427 each for the year, 71,795 of the persons employed being females and 9,378 being children. The proportion paid to these two classes cannot be distinguished, but it may be supposed to average for both not over $250 per year. At Philadelphia 185,527 persons are reported to have received $64,265,966 in wages, or $346 each for the year, the number of females being 56,818 and of children 15,634. The minimum rate of wages for both cities may be fairly stated to be $9 for men, $5 for women and $2.50 for children per week.

In contrast with this average of rates for 1880 there was in Philadelphia not more than half as much paid to most classes of labor thirty or forty years ago. In June, 1835, an official report of the wages paid to females in book-folding was mader 19 employers, with 168 females folders employed, reported their wages as realizing from $2 to $3.50 per week only, the average being $3.25. On January 16, 1839, a report on the earnings of sewing women showed that they could obtain at piece-work not more than 94 cents per week, and societies were formed for the amelioration of their condition. This change is due to the growth of the productive industries and to the diversity which has become so great and general. The industries have also themselves changed, having become transformed by better methods. Diversity of employment is, however, the leading cause of the great amelioration of the social condition of the great body of the people, especially in the citits. The number of distinct industries so conducted as to employ persons at remunerative wages has increased three-fold within twenty-five years, and the change from single or household employments to co-operative employment and the discipline of the work-room increases the efficiency of labor to three or four times its capacity when isolated. The census of 1880 gave, in very crude form, a tabulated statement of the industries of twenty leading cities, the first and most serious defect being the limitation of the numbers or the failure either to obtain or to distinguish the industries in full. But imperfect as the list is in each case, the statements are valuable and instructive. The following is the number assigned to each city:

Baltimore	118	Milwaukee	62
Boston	142	Newark	78
Brooklyn	121	New Orleans	59
Buffalo	78	New York	164
Chicago	189	Philadelphia	195
Cincinnati	125	Pittsburgh	70
Cleveland	77	Providence	69
Detroit	61	St. Louis	117
Jersey City	35	San Francisco	115
Louisville	73	Washington	52

In each case, however, there is a large list of single industrinl establishments not scheduled separately, but merged in a "miscellaneous" aggregate—this number ranging from 43 as the lowest, at New Orleans, to 116 as the highest, at Boston, and averaging about 70.

The percentage for each of the twenty cities of the population engaged productive industry, is itself a study worthy of more attention than it has received. The census figures of 1880 illustrate this relation so much as to be very full of interest, but they are far from being conclusive.

	Per cent.		Per cent.
Baltimore	17.0	Milwaukee	18.1
Boston	16.3	Newark	22.0
Brooklyn	8.4	New Orleans	4.4
Buffalo	11.6	New York	18.7
Chicago	11.7	Philadelphia	21.9
Cincinnati	21.4	Pittsburgh	23.6
Cleveland	13.5	Providence	19.9
Detroit	13.8	St. Louis	11.8
Jersey City	8.3	San Francisco	12.6
Louisville	14.1	Washington	4.8

Bradstreet's, in editorially commenting on Mr. Blodget's article, says: Mr. Blodget presents a statement showing the percentage of the population engaged in productive industries in the twenty chief manufacturing cities of the country. In the following table we reproduce his percentages in order to bring them into direct comparison with our own, which show the percentage of population engaged in all classes of occupation, and, by subtraction, the percentage of population engaged in industries other than productive:

Cities.	Population.	Per cent. Productive industries.	Per cent. popular'n engaged in All classes of occupations.	Per cent. popular'n engaged in Industries other than productive.
Baltimore	332,313	17 0	39.2	22.2
Boston	362,839	16.3	41.1	24.8
Brooklyn	566,663	8.4	36.8	28.4
Buffalo	155,134	11.6	36.5	24.9
Chicago	503,185	11.7	38.1	26.4
Cincinnati	255,139	21.4	39.0	17.6
Cleveland	160,146	13.5	35.5	22.0
Detroit	116,340	13.8	33.7	19.9
Jersey City	120,722	8.3	35.0	26.7
Louisville	123,758	14.1	36.5	22.4
Milwaukee	115.587	18.1	35.3	17.2
Newark	136,508	22.0	35.9	13.9
New Orleans	216,090	4.4	36.2	31.8
New York	1,206,299	18.7	42.5	23.8
Philadelphia	847,170	21.9	41.4	19.5
Pittsburgh	156,389	23.6	33.3	9.7
Providence	104,857	19.9	41.8	21.9
St. Louis	350,518	11.8	39.9	28.1
San Francisco	233,959	12.6	44.7	32.1
Washington	147,293	4.8	38.8	34.0

Although these cities are pre-eminently manufacturing centers, yet in only four of them—Milwaukee, Newark, Philadelphia and Pittsburgh—is the percentage engaged in manufactures in excess of that engaged in industries not essentially productive. This shows plainly that all classes of occupations keep pace—in some cases outreaching—the gigantic strides of our manufacturing industries.

Cleveland as a Vapor Stove Center.

"J. M. A." writes to the editor of the American Artisan: It is a notable fact that when a new branch of business or a new industry is established, men are ever ready to engage, especially if it is a calling which promises a reasonable degree of profit. It is but a few years since the vapor stove business assumed any degree of perfection, and now, after so short a time, it may be considered one of the leading industries. Particularly is it so in Cleveland. Commencing in a moderate way, with but very little capital, it has outgrown every expectation, giving employment to a large number of men and operating with a very extensive capital. There are a great many patents on gasoline burners, each differing somewhat from the others in general appearance, although the same principle, in the main, is involved in each. Of late there has been considerable jealousy exhibited, especially between the larger companies, and numerous disputes with regard to the validity of patents, which will undoubtedly have to be adjusted in the courts. Should this be so, a general uprising is expected, and the smaller concerns will have to succumb, or at least be in subjection to the larger ones. At present it would be difficult to say which will come off victorious, but in the near future I expect to see important changes. These changes will be unexpected to a large part of the vapor stove fraternity. It would seem that the difficulty might be adjusted between the several companies without resort to legal proceedings, but probably will not, as such would be an exception.

AVAILABLE iron ore in East Tennessee is estimated at 50,000,000 tons; at the usual rate of use of ore it would take twelve furnaces, making fifty tons per day, 125 years to consume it.

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Contains over 1,000,000 Industrial Facts, Processes, Calculations, Legal Items, Business Forms, Rules, etc., of paramount utility to every Manufacturer, Mechanic, Farmer, and Business Man. Gives full details about Lumbering, Sawmills, Planing Mills, Saw-filing, Speed of Wheels, Pulleys, Drums, Circular Saws, Wood-working Machinery, etc. On Mill-dams, Water-wheels, Horse-power of Streams, Power of Steam, Wind, etc.; Tensile, Torsional, and Crushing Strength of Materials; Seasoning of Timber (19 ways), Logging, Cost of Supplies, Stream-driving, Lumber Measurement and Surveyors' Tables, full and complete. Details for Cotton, Woollen, and Fulling Mill Machinery; do. for Flour, Oatmeal, Shingle, Paper, and Wind Mills, Grain Elevators, Sugar, Oil, Marble, and Rolling Mills, Blast Furnaces, Gas-works, Water-works, Hydraulics, etc. The work contains 500 ENGRAVINGS, 461 TABLES, containing over 500,000 Calculations; full details for Constructing, Operating, and Repairing Mill and Steam Machinery of every kind. New process Milling, Balancing Mill-stones, Setting of Valves, Link and Valve Motion, Eccentrics, Indicator Diagrams, Injectors, Steam Boilers, Gauges, Machinists' Tools, Mechanical Movements, Tunnelling, Mining, and Rock-drilling Machinery; Plans of Mills, Bridges, etc. Instructions to ENGINEERS, FIREMEN, BOILER-MAKERS, ENGINE AND CAR BUILDERS; Proportion of Engines, Boiler and Steam-pipe Covering, Scale Preventives (10 kinds), Cements (69 kinds), Steam-packing, Bright Polish (4 kinds). Details for Locomotive and Railroad Car Construction; to Repair Locomotive Break-downs on the Road; details in immense variety for Gas, Steam, Civil, and Mining Engineers, Machinists, Blacksmiths, Iron-founders, Miners, Metallurgists, Assayers, Plumbers, Gas-fitters, Tinmen, Coppersmiths, Builders, Metal and Wood Workers of every trade. Alloys for all purposes (418 kinds). On Prospecting, Mining, Processes of Gold and Silver Extraction, Refining, etc. On Lathe-gearing, Screw-cutting, Gear-cutting, Gearing Compound Lathe, Turning, Boring, Filing, Finishing, Bevel-gears, Shafting, Belting, Friction, Tool-making, Tempering, Annealing, Toughening and Tempering of Steel, Tempering Liquids, Metallic Tempering Baths, Welding Compounds, Case-hardening, etc., U. S. Government $10,000 Tempering Secret. To make Cutting, Drilling, and Boring Tools, Screws, Taps, Files, Emery Wheels, Reamers, Cold Chisels, Safes, Springs of all kinds, Mill-picks, Stone-cutters' Tools, Cutlery, Dental and Surgical Instruments, etc. Items for Iron, Brass, Bronze, Type, Stereotype, and Bell Founders, Pattern-makers, etc. Diam., Cir., and Areas of Circles, Pitch of Wheels, Specific Gravities, Expansion of Metals, Smelting of Metals, Reducing of Oxides, Making of Crucibles, Weight of Metals, Capacities of Tanks, Cisterns, Boilers, Weight of Water, Heating of Buildings, Jointing of Pipes, etc. To Compute Power of Steam Boilers. Bronze Dips, Lacquers, Japans, etc. (93 kinds). Carpentry, Diagrams of Roofs, Tonnage Tables, Stowage in Ships, Modelling of Vessels, Ship-building, Navigation, Solid Contents of Boxes, Bales, Stones, Barrels, Timber, Freights by Rail and Water, Tonnage Rules, Estimates, Tables, etc., for Masons, Bricklayers, Plasterers, Roofers, Stucco Workers. On Art work, Decoration, Painting, Sign Writing, Frame Gilding, Wood Staining, Varnishing, Polishing, Glass Signs, etc., (600 items). Glass Staining and Gilding, Photography, Restoring Old Paintings, etc. 500 Items for Watchmakers, Jewellers, Gilders; 800 Items for Printers, Authors, and Publishers; 400 Health Items. Details for Merchants on Banking, Bookkeeping, Advertising, Safe Business Rules, etc.; Exchange Tables, Ready Reckoner, Interest, Coal, and Tonnage Tables, Standard and Metric Systems of Weights and Measures, Sterling Tables, Rules for Computing Profits, Percentages, etc.; 400 Receipts for Grocers, Confectioners, etc.; 300 Receipts for Dyers, Bleachers, Hatters, Paper Manufacturers, Pulp Colors, etc.; 400 for Trappers, Tanners, Curriers, Boot, Shoe and Harness Makers; 10,000 Trade Secrets and Scientific Facts. Thousands of details for Farmers; Land, Grain, Hay, and Cattle Measurements, Contents of Granaries, Corn-Cribs, etc.; Fencing, Ploughing, Planting, Seed, and Breeding Tables, Food and Manure Values, 16 Fertilizers, Horse and Cattle Remedies, all kinds. To Break, Train, and Shoe Horses, Rotation of Crops, to Kill Farm Pests; Rural Economy, Soiling of Stock, Bee-keeping, Construction of Hives, Plans of Barns, Butter and Cheese Making, etc. Business Forms, all kinds. Legal Items, Special Laws of 49 States, Territories, and Provinces (in the U. S. and Canada) relating to the Collection of Debts, Exemptions from Forced Sale, Mechanics' Lien, the Jurisdiction of Courts, Transfer of Real Estate, Rights of Married Women, Interest and Usury Laws, Limitation of Actions, etc.

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We will send the above work as a PREMIUM to every new subscriber to the TRADE REVIEW AND WESTERN MACHINIST who sends the regular subscription price—$3.00—and 15 cents to pay postage on PREMIUM.

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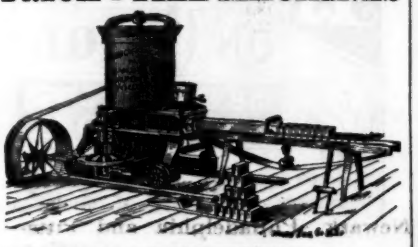
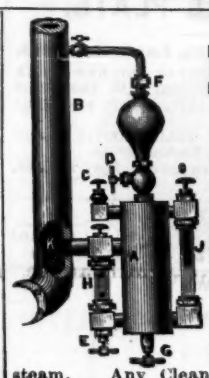


For Catalogue and prices, address

J. W. PENFIELD,
Willoughby, Ohio.

Mention this paper. 81



THE DETROIT

Lubricator Co.'s

SIGHT FEED

LUBRICATOR CUPS.

For oiling valves and cylinders of steam engines, by the only perr fect method, through the steam pipe. The oil passes in sight, drop by drop, into the column of steam where it vaporizes, thus becoming a STEAM LUBRICANT, oiling perfectly every part reached by the steam. Any Clean Oil, black or white, light or heavy, may be used. Saves from 50 to 90 per cent. in oil and wear of machinery, thus paying for itself several times a year. A cup will be sent to responsible parties on twenty days' trial if desired. In ordering give diameter of cylinder.

NOTICE.

The first lubricators ever made, showing the oil passing drop by drop through a transparant water chamber, were devised by us, and the same are fully embraced by many Letters Patent owned and controlled by us, which have been sustained in several hotly contested legal contests. Our customers, therefore, need have NO FEARS in their purchase and use. We are the sole owners of the "Sight Feed" feature as claimed by us, and we shall hold purchasers and users responsible who are encroaching upon our rights by the unlawful use of our device.

DETROIT LUBRICATOR CO.
Office 98 Griswold street, Detroit, Mich.

Note—In our recent suit against the American Lubricator Co., of Detroit, before Justice Stanley Matthews, of the U. S. Supreme Court, involving their "Sight Feed" feature, a decree was rendered in our favor August 20, 1881.
(Mention this paper.)

WM. BINGHAM & CO., Sole Agents for this territory.

AKRON POLISHING —AND— PLATING WORKS.

Stove Work a Specialty.

Gold, Silver and Nickel Plating. Work Guaranteed. We employ Improved Methods of our own in treating this work. Write for prices.

Akron, O.

33

ECLIPSE ELECTROTYPE AND ENGRAVING CO.

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CHAS. W. DEAN. CLEVELAND, OHIO.

THE Gas Engineer notices a new cement for gas, steam, and water pipes, which is prepared by mixing equal parts of quicklime, cement, potter's clay, and loam, well dried and finely ground. After thorough mixing and sifting to remove the lumps, six parts of the mixture are ground up with one part of linseed oil varnish, and it is then ready for use.

THE water is so high in the St. Lawrence river that over 100 of the Thousand Islands are entirely submerged.

Beaver Falls Steel Works.

BEAVER FALLS, PA.

Manufacturers of all kinds of STEEL. Special "Beaver" Tool, Die, and Axe Steel, Iron Center, Soft Steel Center, and Cast Plow Steels. Open Hearth Bessemer Agricultural Steel Shapes. Finished Rolling Coulters and Patent Cutlery Steel. 82

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Detroit & Cleveland Steam Navigation Co. Palace Steamer

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Four Trips per week, leaving Detroit respectively Mondays and Saturdays 11 p. m. Wednesdays and Fridays, 9:15 p. m. stopping at St. Clair, Port Huron, Sand Beach, Oscoda, Alpena Cheboygan, St. Ignace.

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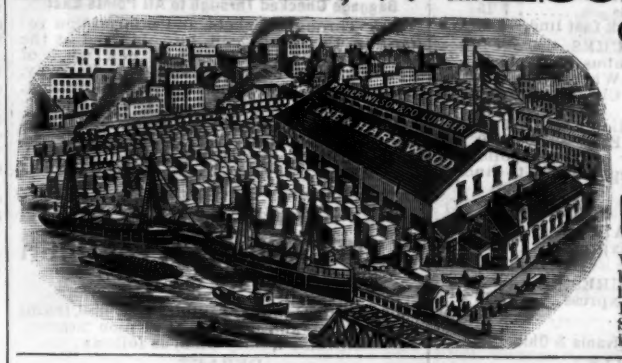

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Wholesale Dealers in
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HARDWOOD
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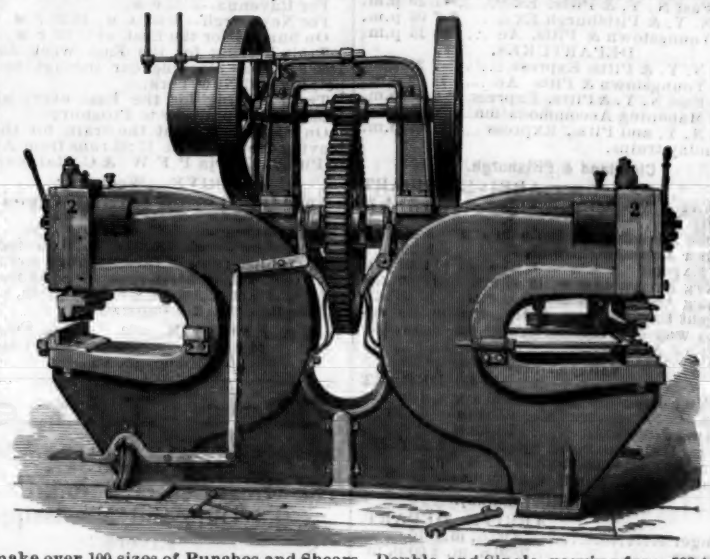
Worked and Rough Lumber of all kinds always on hand, dry. Also, Shingles, Lath, Timber, Doors, Sash, Blinds and Moldings. 13

Power Punches, Shears and Hammers.

Adjustable Helve Cushioned Hammers



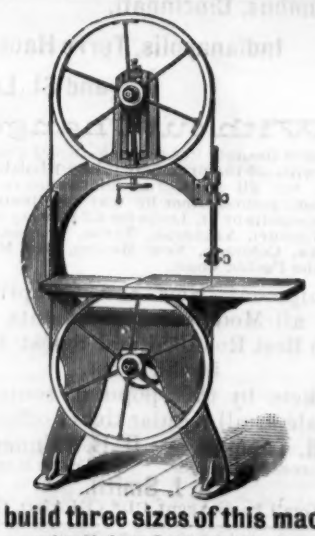
OF ALL SIZES.

Unequalled for Efficiency and Durability.

We make over 100 sizes of Punches and Shears. Double and Single, varying from 500 to 36,000 pounds in weight, and adapted for every variety of work. The Double machines are equal to two Single ones as each side is worked independently.

The Long & Allister Co. 23 **HAMILTON, OHIO.**

Eureka Band Saw.



We build three sizes of this machine
with 26, 30 and 38 inch wheels.
The two smaller sizes will saw hard wood 12 in. thick, the largest 16 in. thick. They are made of the best material and are well made.
For further information address
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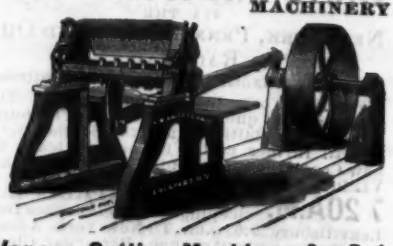

Vaneer Cutting Machines for Cutting Berry Box and Picture Back Lumber from the Log.

Also Second-hand Machinery of all kinds.

Lockport, N. Y.

33 **Send for Catalogue.**

THE MONOLITH.

TRAVELERS' REGISTER.

Lake Shore & Michigan Southern.

TRAINS GOING EAST.	Arrive. From West.	Depart. From East.
Fast N. Y. Express	*1 35 a m	*1 50 a m
N.Y.,Bo't'n & At. Ex.	*7 05 a m	*7 30 a m
Elyria Accommodation	†8 35 a m	.....
Pt.Clinton Accomd'at'n	†11 00 a m	.....
Buffalo Accommodation	†11 00 a m	†11 15 a m
N. Y and B't'n Fast Ex.	*2 25 p m	*2 55 p m
Conneaut Accom'dation	.....	†4 50 p m
Night Express	†10 10 p m	†10 35 p m

TRAINS GOING WEST.	Arrive. From East	Depart. From west.
Fast Limited Express	*12 23 a m	*12 33 a m
Mich. Ex. via Sandusky	*2 50 a m	*3 05 a m
Chi. Ex. via Sandusky	†6 35 a m	7 00 a m
Mich. Ac. via Norwalk	.....	†6 40 a m
Conneaut Accom'dat'n.	†8 40 a m	.....
Toledo Ex. via Norwalk	†1 25 p m	†3 30 p m
St. Louis Ex. via San'ky	*1 40 p m	*2 05 p m
Chi. Pac.Ex. via Nor'lk.	*7 05 p m	*7 35 p m
Pt.Clinton Accom'dat'n	.....	5 00 p m

Sunday trains for Nottingham—Depart 0:00 a. m. and 2:15 p. m., return at 10:05 a. m. and 4:45 p. m.

Reference marks—*Daily. †Daily except Sunday. ‡Daily except Monday.

Cleveland, Columbus Cincinnati & Indianapolis.

ARRIVALS.

No. 2 Col. & Cin. & Ind'polis Ex.	*7 10 A.M
No. 8 C. L. & W. and Galion Exp	9 30
No. 12 St. Louis & New York Exp.	*3 20 P.M
No 6 Indianapolis & Columbus Exp	10 00
No. 4 Columbus & Cincinnati Exp.	*3 50
No. 10 Wheeling Express	7 15
No. 14 Cincin. New York fast line,	1 40 A.M

DEPARTURES.

No. 1 Cincinnati & Columbus Exp.	*8 00 A.M
No. 11 Cleve, Indianap.&Wheel'g Ex	7 10
No. 3 Special St. Louis & Cin. Ex.	**2 15 P.M
No. 5 Night Express,	*7 10
No. 7 C. L. & W. and Galion Exp	5 00
No. 17 Spec. Col. Cin'ti. Exp.	1 50

**This train runs daily to Indianapolis and St. Louis, and daily, except Sunday, to Cincinnati.

Cleveland, Lorain & Wheeling.

ARRIVALS.

Wheeling & Cleveland Express	7 15 P.M
Uhrichsville Express	9 30 A.M

DEPARTURES.

Wheeling & Cleveland Express	7 10 A.M
Uhrichsville Express	5 00 P.M

New York, Pennsylvania & Ohio.

ARRIVALS.

No. 1 New York Expaess	*6 40 a.m.
No. 7 Mahoning Valley Ac	11 55 a.m.
No. 5 Fast N. Y. & Pitts. Ex	*1 40 p.m.
No. 3 N. Y. & Pittsburgh Ex	*7 05 p.m.
No. 9 Youngstown & Pitts. Ac	10 15 p.m.

DEPARTURES.

No. 12 N. Y. & Pitts. Express	*7 20 a.m.
No. 6 Youngstown & Pitts Ac	11 05 a.m.
No. 4 Fast N. Y. & Pitts. Express	*2 50 p.m.
No. 2 Mahoning Accommodation	4 35 p.m.
No. 8 N. Y. and Pitts. Express	11 05 p.m.

*Sunday trains.

Cleveland & Pittsburgh.

	ARRIVE.	DEPART
Pittsburg & Wheeling	2 30 P.M	8 25 A.M
Express	7 30	2 00 P.M
Alliance Accommodation	10 10 A.M	3 45
Ravenna Accommodation	8 37	5 30
Night Express	6 25 A.M	†11 40 P.M
Newberg Accom'dation	12 10 P.M	11 00 A.M
Newberg Accom'dation	1 50 P.M	12 30 P.M

† Night Express runs daily, except Saturday, by way of Wellsville, and on Saturday by way of Alliance.

Valley Railway.

	ARRIVE.	DEPART
Wheeling Junction	10 15 A.M	8 30 A.M
Canton	1 35 P.M	6 15 P.M
Wheeling Junction	6 15 P.M	3 20 P.M

Special trains leave on Sunday at 4.20 P.M., arriving at Cleveland at 7.15 P. M.

Depot foot of South Water Street.

Connotton Valley Railway.

	ARRIVE.	DEPART.
Passenger	8 00 a. m.	8 10 a. m.
Passenger	10 20 a. m.	2 00 p. m.
Passenger	6 35 p. m.	4 25 p. m.

Depot corner Commercial and Fifth Streets

Cleveland, Akron & Columbus Railroad,

Cleveland, Akron & Columbus Railroad, running over Cleveland & Pittsburgh Rail road to Hudson, for Akron, Columbus, etc.

	ARRIVE.	DEPART.
Mail	2 30 P.M	8 25 A.M
Express	7 30	2 00 P.M
Accommodation	10 10 A.M	3 45 P.M

"The Nickel Plate."

	ARRIVE.	DEPART
Local Passenger	10 00 P.M	3 48 P.M
Local Passenger	9 18 A.M	6 55 A.M
Conneaut Accom'dation	9 05 A.M	4 30 P.M

Cleveland to New York,

VIA THE

NEW YORK, PENNSYLVANIA AND OHIO RAILROAD.

(Formerly Atlantic & Great Western Railroad)

For New York, Boston and the East. The shortest and quickest route to Pittsburgh Washington, Baltimore and the Southeast.

Until further notice trains will leave the new Central Depot, South Water Street and Viaduct, as follows:

7 20A.M. LIGHTNINGEXPRESS(daily) sleepingand hotel coaches from Leavittsburg, 9:05 a.m. To New York, Albany and Boston without change. Parlor car, Cleveland to Salamanca. Arrives at Meadville 11:20 a.m., (dinner); Franklin, 12:33 p.m.; Oil City, 1:00 p.m.; Corry, 1:00 p.m.; Jamestown, (Lake Chatauqua) 1:57 p. m.; Buffalo, 6:15 p. m.; Rochester, 8:30 p.m.; Hornellsville, 6:40 p. m., (supper); Corning, 8:25 p.m.; Elmira, 8:57 p.m.; Binghampton, 10:58 p.m.; Albany, 6:00 a.m.; Boston, 2:45 p.m.; arriving at New York, 6:50 a.m.

2:50P.M. LIMITED EXPRESS, Pull-(daily). Sleeper Cleveland to New York, Arrives at Meadville, 6:55 p m.; Jamestown, 9;13 p. m.; Salamanca, 10:10 p. m.; Now York, 10:25 a. m.

11:25 P.M. NIGHT EXPRESS, (daily ex-cept Sunday), Sleeping Coach from Leavittsurg to New York without change. Arrives at Youngstown, 1:45 a.m.; Pittsburgh, 6:15 a. m.; Washington 9:15 a. m.; Baltimore 10:34 p. m.; Meadville, 3:50 a. m.; Corry, 5:20 a.m.; Jamestown, 6:22 a.m.; Buffalo, 9:45 a. m.; Rochester, 1:10 p. m.; Hornellsville 1:20 a. m.; Corning, 12:53 p. m.; Elmira 1:21 p. m.; Binghampton, 2:50 p.m.; New York 9:25 p.m.

2:50 P.M. PITTSBURGH EXPRESS, daily, through without change. Parlor Car, Cleveland to Pittsburgh, arrives at Youngstown, 5:00 p.m.; Pittsburgh, 7:48 p.m.; Washington, 7:30 a.m.; Baltimore, 8:19 a.m

4:35 P.M. MAHONING ACCOMMODATION, stopping at all way stations. Arrives at Youngstown, 7:25 p.m; Sharon, 8:30 p.m; Sharpsville 8:40 p. m; connects at Leavittsburg with train No. 20 for Meadville and intermediate points, arrives at Meadville, 11:05 p.m. Pittsburgh, 10:48 p. m.

7:20 A.M. PITTSBURGH EXPRESS, —(daily) through without change. Arrives at Youngstown, 9:50 a.m.; Sharon, 10:55 a.m.; Sharpsville, 11:05 a.m.; Pittsburgh, 12:45 p.m. Returning, leave Pittsburgh, 4:48 a.m., 8:33 a.m., and 1:13 p. m. and 4:20 p.m.

11:05 A.M. YOUNGSTOWN& PITTSBURGH Accommodation, stopping at all Way Stations, arriving at Youngstown 1:50 p.m.; Pittsburgh, 6:10 p.m. Trains arrive at Cleveland, 6:40 a.m., 7:05 p. m., 10:55 a. m 1:40 p.m., and 10:15 p.m.

☞ This is the only route by which passengers can reach Corry, Elmira, Binghampton, New York City, and intermediate points WITHOUT CHANGE. No change to Boston and New England cities.

Baggage Checked Through to All Points East

☞ Through Tickets and information regarding the route can be obtained at the office 131 Bank street, and at newDepot of New York, Pennsylvania and Ohio Railway, South Water street and Viaduct, Cleveland.

A. E. CLARK,
Gen. Pass'r. Agt., Cleveland, Ohio.
M. L. FOUTS,
J. M. FERRIS, Pass. Agt.,131 Bank st.,
Gen. Man'gr, Cleveland Cleveland.

TIME TABLE.
CLEVELAND & PITTSBURGH
RAILROAD.

On and after Sunday, January 21st, 1883, trains depart from and arrive at Union Station, Cleveland, (city time) as follows:

DEPART.

For the East--8:20 A.M.; 1:55 P.M., 11:35 P.M
For Alliance--3:40 P.M.
For Ravenna--5:25 P.M.
For Newburgh--10:55 A.M; 12:25 P.M.
On Sunday for the East, at 11:35 P.M.

Train leaving for the East (week days) at 1:55 P.M. has sleeping car through to Philadelphia and New York.

Train leaving for the East every night at 11:35 has sleeping car to Pittsburgh.

On Saturday night the train for the East leaving Cleveland at 11:35 runs from Alliance to Pittsburgh via P.F.W. & C. Railway.

ARRIVE--(Week Days.)

From the East--6:20 A.M.; 2:25 P.M.; 7:25 P.M
From Alliance--10:05 A.M.
From Ravenna--8:32 A.M.
From Newburgh--12:05 P.M.; 1:45 P.M.

Time tables, rates of fare, through tickets and further information can be obtained from M. G. Carrel, agent, Union Station, or C. L. Douglass, No. 212 Bank street.

WM. A. BALDWIN, Manager, Pittsburgh, Pa.
E. A. FORD, Gen. Pass. Agt.

Bee Line.

Cleveland, Columbus,Cincinnati & Indianapolis Railway.

The Great Central Trunk Route to the Ohio and Mississippi Rivers.

Three Trains Week Days,

TWO TRAINS SUNDAY.

Leave Cleveland with Through Palace Coaches and Elegant Sleeping Cars for

Columbus, Cincinnati,

Indianapolis, Terre Haute

and St. Louis

Without Change.

This is the only line making Direct Connection with all the principal Trunk Lines of the East for all Southern, Southwestern and Western points, either by way of Cincinnati, Indianapolis or St. Louis for all railway towns in Missouri, Arkansas, Texas, Kansas, Nebraska, Colorado, New Mexico, Old Mexico and the Pacific Coast.

Equipment New and Comprising all Modern Improvements.

The Best Roadbed and Safest Road in the West.

Tickets by this popular route for sale at all regular ticket offices.

E. B. Thomas, General Manager. **O. B. Skinner,** Traffic Manager.

A. J. Smith,
Gen'l Pass. Agent, CLEVELAND, O.

Address, TAYLOR MFG. CO., Chambersburg, Pa.
(Please Mention this Paper.)

Blue Grass Route of Ohio
TIME TABLE.

In effect July 16, 1883.

The Cleveland, Mt. Vernon and Delaware RAILROAD.

GEO. D. WALKER, RECEIVER.

SOUTH-BOUND TRAINS.

	Mail.	Expr'ss.	Acc'm	Acc'm
Leave.				
Cleveland	8 25 am	2 30 pm	3 45pm	.....
Hudson	9 40	3 35	5 00	.....
Cuyahoga F's.	9 58	3 53	5 24	.....
Akron	10 14	4 08	5 40	.....
Clinton	10 45	4 44	6 11	.....
Warwick	10 50	4 49	6 16	.....
Orrville	11 14	5 15	6 40	.....
Fredricksburg	11 45	5 46	7 13	a. m.
Millersburg	12 08 pm	6 08	7 35 ar	5 25
Gann	15 55	6 58	.....	6 15
Danville	1 07	7 09	.....	6 26
Gambier	1 27	7 29	.....	6 46
Mt. Vernon	1 55 D	7 54	.....	7 15 B
Centerburg	2 26	8 27	.....	7 50
Westerville	2 10	9 10	.....	8 38
Columbus arr.	3 35	9 35	.....	9 05

NORTH-BOUND TRAINS

STATIONS.	Expr'ss.	Mail.	Acc'm	Acc'm
Leave				
Columbus	7 10 am	12 10 pm	.....	5 20 pm
Westerville	7 35	12 34	.....	5 48
Centerburg	8 17	1 16	.....	6 33
Mt. Vernon	9 02 B	2 00 D	.....	7 19 S
Gambier	9 14	2 11	.....	7 29
Danville	9 34	2 29	.....	7 49
Gann	9 46	2 40	.....	8 01
Millersburg	10 38	3 27	5 45am	8 50 arr
Fredricksb'g	11 00	3 47	6 06	.....
Orrville	11 33	4 17	7 10 B	.....
Warwick	11 56	4 39	7 37	.....
Clinton	12 02 pm	4 44	7 46	.....
Akron	12 35	5 14	8 20	.....
C'yahoga F's	12 50	5 26	8 33	.....
Hudson	1 10	5 43	8 53	.....
Ar. Clevel'd	2 25	6 55	10 10	.....

B Breakfast. D Dinner. S Supper.

N. MONSARRAT, Gen'l Supt. Akron, O
E. T. AFFLECK, General Passenger Ag't, Columbus, O.

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At Chicago, Passenger Trains arrive at and leave Union Depot, Van Buren street.

Following is the time in effect May 14, 1883, and until further notice:

GOING EAST.

	Local Pass'n'gr	Local Pass'ngr.	Con'eaut Accom.
Lv. Chicago	8 15 am	.....	.....
Ar. Valparaiso	10 05	.....	.....
" Ft. Wayne	1 30 pm	.....	.....
" New Haven	2 05	.....	.....
" West Leipsic	4 09	.....	.....
" Arcadia	5 10	.....	.....
" Fostoria	5 25	.....	.....
" Gr. Springs.	6 12	.....	.....
" Bellevue	6 40	.....	.....
Lv Bellevue	6 55	8 30 am	.....
Ar Cleveland	9 20 pm	10 55	.....
Lv Cleveland	.....	11 00	5 00 pm
Ar Painesville	.....	12 06 pm	6 15
" Ashtabula	.....	12 58	7 11
" Conneaut	.....	1 25	7 40
" Erie	.....	2 28	.....
" Dunkirk	.....	4 21	.....
" Buffalo	.....	6 00	.....

GOING WEST.

	Local Passn'gr.	Local Pass'ngr.	Con'eaut Accom.
Lv Buffalo	10 15 am	.....	.....
Ar Dunkirk	11 56	.....	.....
" Erie	1 35 pm	.....	Leave.
" Conneaut	2 53	.....	6 10 am
" Ashtabula	3 25	.....	6 39
" Painesville	4 19	.....	7 36
" Cleveland	5 25	.....	8 50
Lv Cleveland	5 30	7 15 am	.....
Ar Bellevue	7 55	9 30	.....
Lv Bellevue	.....	9 40	.....
Ar Gr. Springs	.....	10 07	.....
" Fostoria	.....	10 46	.....
" Arcadia	.....	11 00	.....
" West Leipsic	.....	11 58	.....
" New Haven	.....	2 05 pm	.....
" Ft Wayne	.....	2 20	.....
" Valparaiso	.....	6 25	.....
" Chicago	.....	8 20	.....

FOR ROCKY RIVER.

Commencing Sunday, June 17, 1883, trains between Cleveland and Rocky River, (on Sundays only), will run as follows:

WESTWARD.

Leave Cleveland—(Broadway Station) 8 15 a.m; 9 50 a.m; 12 50 p.m; 4 10 p.m; 7 00 pm.

Pearl Street— 8 23 am; 9 58 am; 12 58 pm; 4 18 p m; 7 08 pm.

Lorain Street— 8 30 am; 10 05 am; 1 05 pm; 4 25 pm; 7 15 am.

Arrive River Bank— 8 55 am; 10 30 am; 1 35 pm; 4 50 pm; 7 40 pm.

EASTWARD.

Leave River Bank— 9 00 am; 12 00 noon; 3 20 pm; 6 00 pm; 8 20 pm.

Arrive at Cleveland (Lorain Street— 9 25 am; 12 25 pm; 3 45 pm; 6 25 pm; 8 45 pm.

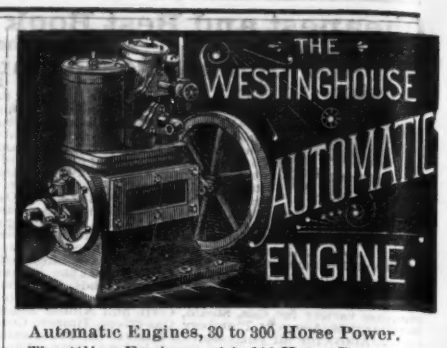
Pearl Street— 9 32 am; 12 32 pm; 3 52 pm; 6 32 pm; 8 52 pm.

Broadway Station— 9 40 am; 12 40 pm; 4 00 pm; 6 40 pm; 9 00 pm.

Trains run by Columbus time, which is twenty minutes faster than Chicago, five minutes slower than Cleveland, and sixteen minutes slower than Buffalo time.

For information, call on nearest Agent of the Company or address

B. F. HORNER, Gen'l Passenger Agent,
LEWIS WILLIAMS, General Manager, Cleveland, O.



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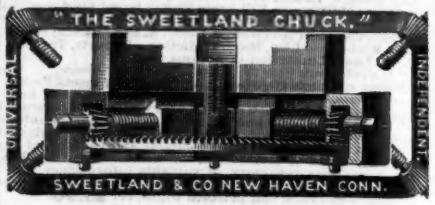

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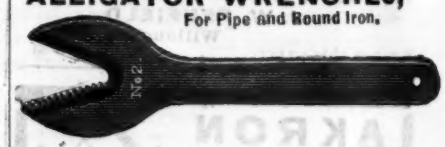

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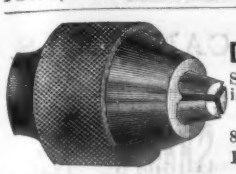

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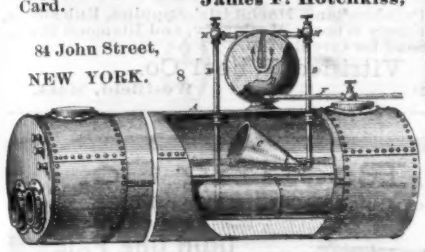

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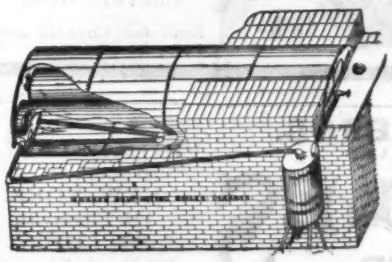

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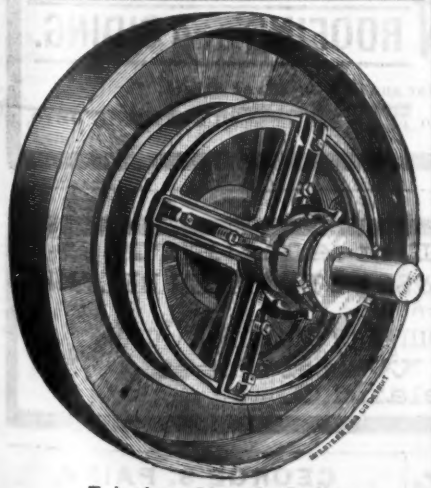

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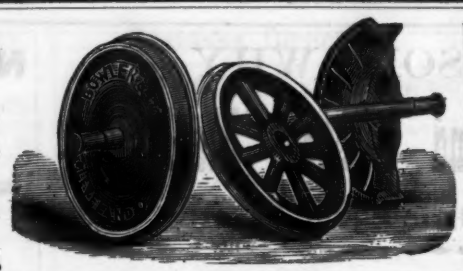

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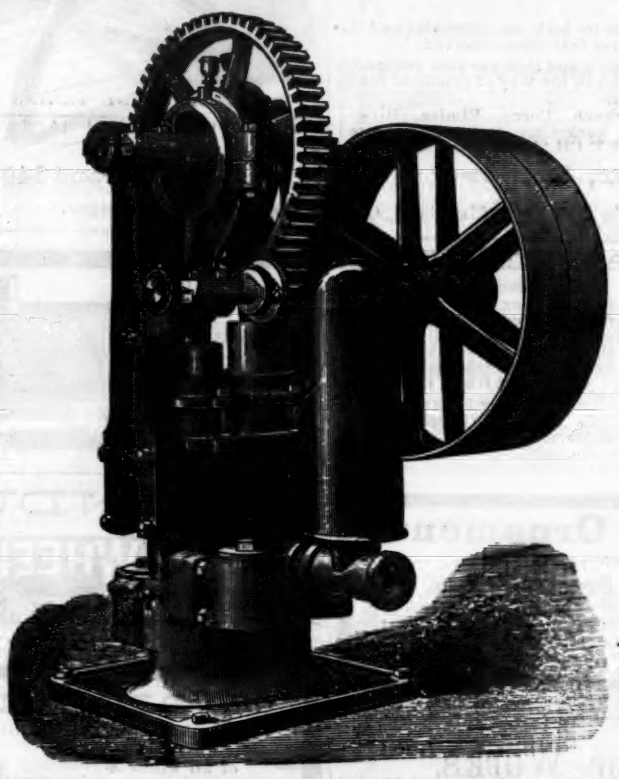

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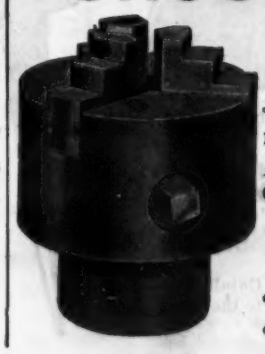

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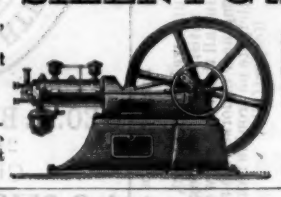

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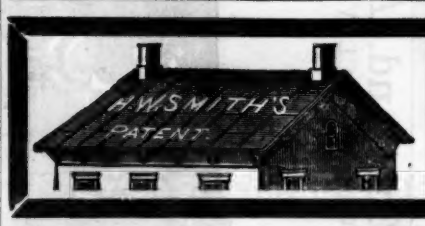

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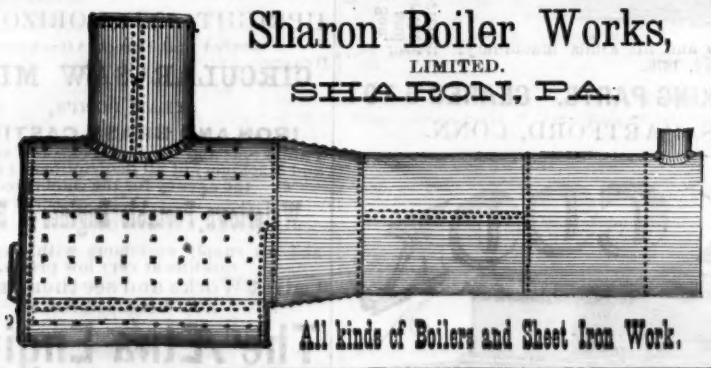

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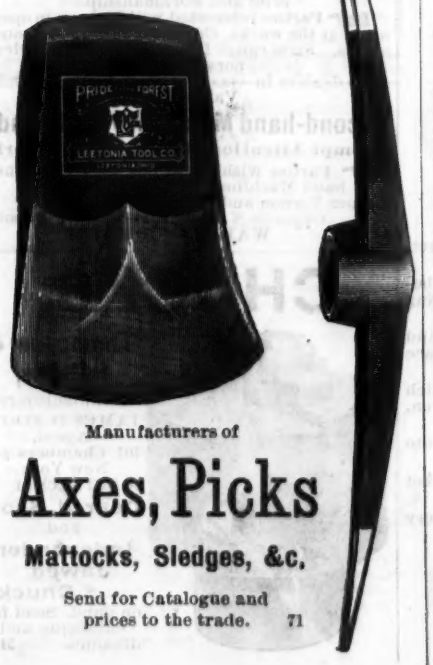

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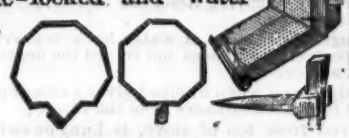

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FITZSIMONS WM. & SON, Rolling Mill and Machinery castings. Rolls a Specialty. No. 435 Broadway. 64

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DENNISON BROS., dealers in Hides, Pelts, Furs and Tallow, 48 and 50 River street. 33

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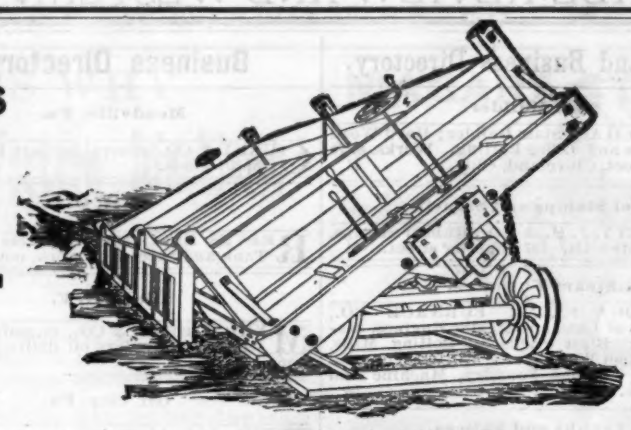
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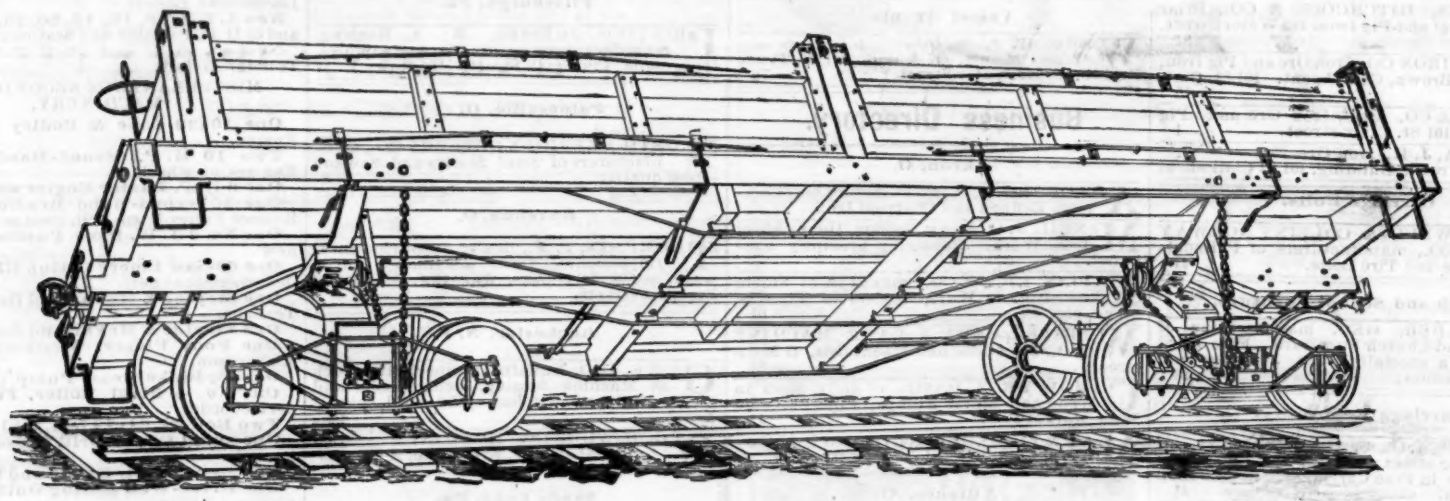
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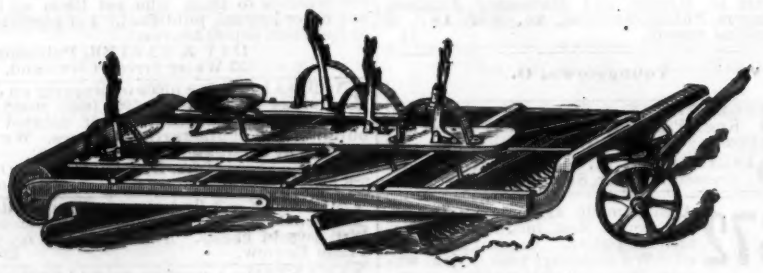

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